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The Thames Embankment.

ONE of the subjects which is at present attracting the deepest attention in Europe, is the condition of the rivers and streams which pass through the great cities. Hitherto, these waterways have been regarded as mere sewers, into which might be cast all the filth and garbage produced by a dense population. Now, however, sanitarians and others see the errors which have been committed in this respect, and the most earnest efforts are made to rectify former blunders. It is well to call the attention of our American cities to this point. Young, and as yet untrammelled, it will be easy to avoid these mistakes, and so arrange our means of getting rid of all sewage that our rivers may remain objects of beauty, and not sources of disease.

London has long presented an unfavorable contrast with that of almost any other great capital of Europe. The Seine, in

THE THAMES EMBANKMENT.

Paris, is enclosed by quays; even the comparatively insignificant Liffy is bounded at each side, as it passes through Dublin, by massive, well-built walls of granite. Yet the Thames might easily have been made one of the grandest features of the British metropolis. Napoleon III. may raise vast streets of palatial structures in Paris; but no amount of artistic taste, no expenditure, however lavish, can ever bestow on that city so magnificent an adornment as may now be fairly expected from even the portion of the Thames embankment which has now been completed. Not the least gorgeous of the details found in the sketches by which artists have endeavored to portray the mighty cities of Assyria in their glory, are to be seen in the splendid terraces and spacious flights of steps which border the rivers that flow through them. The Thames embankment will bring vividly to mind these, and the most striking portions of Turner's "Building of Carthage by Dido."

So far from the Thames having been hitherto an advantage and an ornament to London, it has long been a source of disease and a reproach; it has been a vast cesspool, into which were discharged the sewers of an enormous city. The immense deposits of offensive matter thus formed, and uncovered at low water, constituted the prolific sources of miasma calculated to render the surrounding atmosphere unfitted for the support of human life. Some idea may be formed of the extent of these putrid swamps, from the fact that in the centre of the city the river, at high tide, is fully one-third wider than at either London or Vauxhall bridge. The thousands of acres thus deserted twice daily by the river must, of necessity, under the scorching rays of the summer's sun, produce a pestilential effect. In the same part also are situated the most miserable and dilapidated buildings to be seen on the river's banks.

Almost insurmountable obstacles long opposed every attempt at improvement. The necessity for extensive coal wharves, until recently, would have rendered the expense of a Thames embankment intolerable, notwithstanding the value of the land which would be reclaimed. But the coal wharves are now, in a great degree, rendered unnecessary by the numerous railway depots which have been established. Thanks to a combination of favorable circumstances, not the least important of which is the exclusion of the sewage that so long polluted the waters of a river which, in former times, justly obtained the appellation of the "Silver Thames," London will soon be able to point with pride to a river view unequalled in Europe for extent and embellishment. Even on the score of health, the magnificent promenade now constructed is of the highest importance; and the varied and animated appearance it must undoubtedly present, will hereafter constitute one of the chief attractions of the metropolis. On this, however, as on other such occasions, hardships are suffered by individuals.

Long as the necessity for this great improvement has been acknowledged, it was only in 1862 that an act was obtained authorizing its being carried out. And yet so much time was permitted to elapse after the passing of this act, without apparently any very effective measures being taken for the performance of the work, that it might be supposed considerable apathy existed regarding it. But the necessity for making preparations on a very large scale for so stupendous an undertaking may, in a great degree, account for the delay.

The embankment of both sides of the river ultimately is contemplated; not, perhaps, below Blackfriars Bridge, on account of the immense value of the wharves in that portion of the shore; or, at any rate, not without providing means for introducing barges within the embankment, so that they may be discharged at the various warehouses. A similar provision has been secured for the gas-works adjoining Blackfriars Bridge. The distance between Westminster and Blackfriars Bridge, 7,000 feet in length, comprises the extent of the present work. The work is of the most solid construction, with the exception of the portion just mentioned near Blackfriars Bridge, which is a viaduct sustained on columns that will allow the barges to pass underneath.

A portion of the funds provided by an act of WILLIAM and MARY, which imposed a duty on coal and wine entering London, has been devoted to the work. These funds were originally designed for other purposes, but they have long been expended for metropolitan improvements—among others, for the new approaches to London Bridge. In furtherance of such objects, they could not be more legitimately applied than to the construction of the Thames embankment, which relieves the most crowded streets by a wide and convenient thoroughfare, improves the navigation of the river, and affords the greatest facilities for the making of the "low level sewer," without a necessity for interfering with the Strand and Fleet street.

This great undertaking, of which we present a representation to our readers, naturally divides itself into two portions: that which is unseen, but still is of the highest importance, and requires both extraordinary skill and the employment of all the appliances furnished by modern progress; and that which presents itself to the eye of the spectator.

To secure a good support for the massive constructions that were required, the excavations are at least twenty feet below the surface of the ground; the foundations are laid fourteen feet under low water mark, the space beneath them being filled with concrete, which was allowed to become thoroughly hard before it was built upon. The wall is of brick, and, where necessary, of concrete blocks, with a granite facing, which reaches eight

fect below the surface. Of the portions which were required to be executed below the water level, the excavations between Westminster and Waterloo Bridges were made by means of elliptical caissons, similar to those used in laying the foundation of the Hungerford railway bridge. They were sunk in the river, in successive portions, which will be connected watertight: and those that are above the bed of the river were removed when no longer required, in consequence of the progress of the work. A similar plan was adopted in laying the foundations of the circular piers on which the pillars of the new railway bridge at Blackfriars rest. Below Waterloo Bridge, cofferdams, formed in the usual way by piling, and filling in between the piles with puddled clay, were employed; and when the work was sufficiently advanced, the piles, instead of being drawn out, which might have formed dangerous cavities, and disturbed the embankment, are cut off at a proper level, as was done with those used in building the Houses of Parliament.

Inside the facing wall is the low level sewer, which, for a length of nearly 2000 feet, is 7 feet 9 inches in diameter, and the remainder 8 feet 3 inches. Like the other portions of the embankment, it is raised on a foundation of concrete, and it is formed of brickwork 13½ inches thick, surrounded with concrete. Above this sewer there is a *subway*, the arch of which is 9 feet in span and 7½ feet in height. It is constructed in the same manner as the sewer, with which and the river wall it is tied at proper intervals; nothing being neglected which can secure strength and solidity to every portion of the work. The subway is for gas and water-pipes, and for the purpose of affording access to the sewer; so that no necessity can at any time arise for disturbing the roadway, a difficulty which frequently arises both in Europe and in this country, when gas-pipes, etc., are laid in the usual manner.

The portions of the embankment above the surface of the earth, as may be perceived by our illustration, are of a very magnificent character. No attempt has been made to produce a uniform whole—this was scarcely possible; indeed, the different portions are so broken up and separated by the bridges that it was not necessary, and is scarcely even desirable. The roadway, which is constructed 4 feet above high-water level, is, however, continuous; and, except where it passes from Westminister Bridge with a descent of one foot in eighty, and where it is placed back thirty or forty feet, it runs close to the river wall.

There can be no doubt that the portion of the embankment between Westminister and Waterloo Bridges—that which is seen in the cut—is by far the most striking; it possesses, indeed, features that confer on it extraordinary magnificence. Behind, at the commencement of it, appear the gardens of Whitehall Place and Buccleuch House, as also the wooded grounds of Northumberland House. Beyond Hungerford Bridge is seen the imposing and, no doubt, at some future time, beautiful elevation of the Adelphi Terrace. Here it is to be noticed that the artist has represented the background, rather as there is good reason to suppose it will be, than what is actually existing at present. At the Adelphi, especially, artistic skill can avail itself of circumstances most favorable to the production of truly splendid effects—noble flights of steps, hanging gardens, and magnificent structures, replacing the Adelphi buildings, might conspire to produce a view which nowhere could be rivaled. Inigo Jones's beautiful watergate, at the foot of Buckingham street, will come in use once more. Beyond Waterloo Bridge, also, there will be several interesting features. Somerset—thanks, it would seem, to the forethought of the architect—is at length placed in a fitting point of view. The library and gardens of the Temple likewise add greatly to the beauty of that portion of the embankment.

The roadway is made extremely spacious; it is to be about 80 feet wide in the narrowest parts, and between Westminster Bridge and the Temple 100 feet. A number of lamp pedestals, each with a bronze lion head and a mooring ring of hammered gun metal, are erected on the outer edge of the embankment. There are. too, noble flights of steps leading down to the water, some formed in indentations; others projecting into the river, and flanked with piers and pedestals surmounted by statues, etc. The stairs at the Adelphi are constructed 60 feet wide.

The unsightly steamboat piers have given place to handsome jetties and landing-places,. which will have the advantage of being in direct communications with cabs and omnibuses, etc. As the embankment projects considerably into the river, there will be water at all times of the tide for steamboats to lie close to it. Where there are neither steps nor jetties, its edges will be surmounted by a fine bulustrade.

This new thoroughfare will, it is evident, greatly relieve the present crowded streets; but to obtain from it as much advantage as possible, a number of new approaches to it are found necessary. Hence, not only are the present streets leading from the strand to the river made available, but several new streets are opening in various directions, and the roadway of the embankment will probably be continued in an oblique line from its terminations at Blackfriars Bridge to the Mansion House.

It supplied a convenient means of getting rid of the vast amount of rubbish consequent on the pulling down of so many buildings for the construction of the railway extensions, etc., within the metropolis. But even what was to be had in this way, enormous as was its amount, was totally insufficient, and large additions to it were made from the river itself; 600 barges, of 50 tons each, conveyed what was obtained by dredging, their cargoes having been, by means of false bottoms, deposited at once wherever they may be required.—*The Manufacturer and Builder.*

The Inventor of Spectacles.—On a tomb-stone at Florence is this inscription: "Here lies Salvino Armato d'Armati, of Florence, the inventor of spectacles. May God pardon his sins. The year 1318."

The Laws of the Deflection of Beams Exposed to a Transverse Strain, Tested by Experiment.

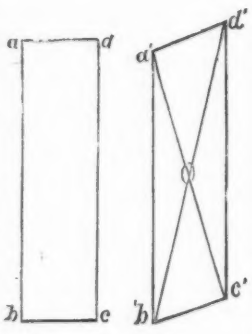
Read before the Association for the Advancement of Science, by W. A. NORTON, of New Haven, Connecticut.

[Conclusion.]

WE may conclude, from these results, that the deflection increases according to a less rapid law than the cube of the length of the stick. We have already seen that it decreases in a less rapid proportion than the inverse cube of the depth. It follows, therefore, that the true formula for the deflection probably contains at least one additional term, which varies less rapidly than as the cube of the length directly and the cube of the depth inversely; or, in other words, contains l in the numerator, and d in the denominator, each raised to a lower power than the cube. Now, if we consider attentively the changes that must occur in the relative position of the molecules within a stick or beam, when it is subjected to a cross strain, we may perceive that a cause of deflection exists which has hitherto been disregarded, or deemed too insignificant in its effects to be taken into account.

It is plain that when a stick, or beam, of a uniform rectangular cross section, resting on two supports, is loaded at its middle, a vertical force equal to one half the weight is transmitted to each support, by the slipping of each vertical section, or lamina, upon the next, until the vertical force of resistance is called into play equal to half the weight. As each section must transmit this same force to the next, the slipping of one section upon another must be the same from the middle to the end. The section at the middle will be directly depressed, from this cause, by an amount equal to the sum of all these displacements that occur between the middle and the end, or to any one displacement multiplied by the number of sections, or indefinitely thin laminæ, in this interval. This depression should, then, be directly proportional to the half-length, or length of the stick. If we compare sticks of the same length, but different cross sections, the number of fibres that are subjected to this cross strain, or the number of material points in each cross section whose vertical resistance will be called into operation by the slipping of this section upon the next, will be proportional to the area of the cross section, and hence the amount of the relative sliding displacement will be inversely proportional to this area. It will be seen, then, that the sinking, or linear deflection of the middle of the beam, thus directly resulting from the slipping of contiguous vertical sections, may be represented by the expression $c\frac{Pl}{db}$; in which P is the load, l the length, b the breadth, and d the depth of the beam, and C a constant that must be determined by experiment.

The theoretical deflection given by the formula which has been under discussion, is due to longitudinal strains on the fibres, indirectly resulting from the same slipping of contiguous sections. If ab and cd represent two vertical cross sections, indefinitely near to each other, of which ab is nearest the middle of the beam, the transmission of the action of the half-weight will cause ab to slip relatively to cd, until a vertical resisting force comes into operation equal to the half weight; and the rectangle $abcd$ will take the form of the oblique parallelogram, $a'b'c'd'$. The diagonal ac will therefore be shortened and bd lengthened. Accordingly, a strain of compression will come into operation along $a'c'$, and a strain of extension along $b'd'$. The reactions to these strains will take place along $a'c'$, from the middle, o, toward a, and from o toward c, and along $b'd'$, from b toward o, and from d' toward o. As a consequence, the points a' and d' will be urged by equal forces toward the left, or toward the middle of the beam, and the points, b' c', by the same forces, toward the right. The sum of the first two forces will then be a longitudinal strain of compression on the upper fibre, and the sum of the last two an equal strain of extension on the lower fibre. It will be observed that the strains here considered as confined to the upper and lower fibres, are actually distributed over all the fibres above and below the middle fibre of the beam.



The conclusions here arrived at, with regard to one indefinitely small rectangle, $abcd$, will be equally true of any other that may be considered between the middle and end of the beam; and the same longitudinal strains will be developed by the slipping of contiguous sections in each rectangle. The entire longitudinal strains on the fibres, at the middle, will then be the sum of the individual strains developed in all the rectangles of the half length of the beam. The ordinary equation of equilibrium of a beam may be readily made out from the present point of view; but we have now only to consider the matter of deflection. It will be seen that the movements, to the left and right, of the angular points of the parallelogram $a'b'c'd'$, that have been signalized, will be attended with a turning of the whole parallelogram from right to left around its centre o. The direct tendency to rotation will be the same for each parallelogram of the half length of the beam, but owing to the propagation of the longitudinal strains on the fibres developed at each parallelogram, from the end to the middle, the actual compressions and elongations will be greatest at the middle, and the actual rotation of the parallogram there will be the greatest. The deflection consequent upon the elongations and compressions of the fibres, is the joint result of the rotary movements of all the parallelograms in the half length of the beam; and it is represented by the formula which has been under discussion.

It would seem, then, that the true theory of deflection conducts to the following formula, in the special case of a beam resting on two supports and loaded in the middle.

$$f = c\frac{Pl}{bd} + \frac{Pl^3}{4Ebd^3}$$

Let us now proceed to compare this formula with our experimental results. For this purpose we will determine the values of the two constants, C and E, for each individual stick, and compare the several values obtained. If the formula be correct, the different sticks all in precisely the same mechanical condition, and the experiments perfectly accurate, we should get the same values for these constants in the case fo each stick. But the experiments are liable more or less to error, and the sticks may differ materially from one another in their mechanical condition; and even where they do not, as the actual deflections experienced are so different with sticks of different dimensions, any changes in the values of the constants that may result from the shifting of the position of the neutral axis, under the operation of the strains, should differ more or less. The derived values of the constants may therefore differ among themselves, within certain limits, without leading us to conclude that the formula is probably at fault.

The following table contains the values of C and E, calculated from the deflections due to one hundred pounds, for two sets of sticks of the same dimensions. They were all over four feet in actual length, but in the experiments the effective lengths taken were either two feet or four feet. The values of E and C were obtained, in some instances, by taking the deflections for the same breadth and depth but different lengths, (either two feet or four feet,) and in other instances by taking the deflections for the same length but different breadths and depths. The results of two sets of calculations are given in the table. In the one, the deflections answering to the least and greatest strains are taken, and the deflection due to one hundred pounds computed from the difference of these by simple proportion; in the other, the same is obtained by taking the deflections answering to strains, or pressures, intermediate between the extreme strains.

TABLE VII.

Sticks.			Difference of Extreme Pressures.		Difference of Intermediate Pressures.	
Set No. 1.			E	C	E	C
l	b	d				
ft. ft.	in. in.	in. in.				
2, or 4	2	1	1,359,500 lb	0.0000108	1,308,430 lb	0.0000082
2	2, or 3	3, or 2	1,560,809 "	0.0000100	1,579,960 "	0.0000095
4	2, or 3	3, or 2	1,584,820 "	0.0000087	1,560,800 "	0.0000078
2, or 4	4	2	1,552,000 "	0.0000140	1,501,200 "	0.0000127
2, or 4	2	2	1,481,800 "	0.0000108	1,423,600 "	0.0000084
Means.....			1,508,986 "	0.0000108	1,474,798 "	0.0000093
Set No. 2.						
ft. ft.	in.	in.				
2, or 4	3	2	1,277,729 lb	0.0000084	1,254,000 lb	0.0000080
2, or 4	2	3	1,295,984 "	0.0000089	1,315,000 "	0.0000088
2, or 4	4	2	1,558,900 "	0.0000110	1,542,800 "	0.0000107
2, or 4	2	2	1,561,822 "	0.0000084	1,600,000 "	0.0000100
Means.....			1,423,609 "	0.0000092	1,427,965 "	0.0000094

The general formula applicable to white pine sticks of the general quality used in these experiments, will be obtained by taking the mean of the several values of E and C, given in the above table. To test the theoretical formula we have obtained, we will take the mean values of E and C for the second set of sticks, given at the bottom of the fourth and fifth columns, namely, E=1,427,965 lbs., and c=0.0000094. We thus have

$$f = 0.0000094\frac{Pl}{bd} + \frac{Pl^3}{5,711,\text{?}60xbd3}$$

or, taking $P = 100$ lbs.,

$$f = 0.00094\frac{l}{bd} + \frac{Pl^3}{57,118.6xbd3}$$

The following table contains the values of f, calculated by this formula, and the results of a comparison of the calculated values of the deflections observed.

TABLE VIII.

Sticks.			Cal. val. of f.	Obs. deflec.	Difference	Ratios of error.
l	b	d	in.	in.	in.	
4 ft.	3 in.	2 in.	0.0882	0.0983	—0.0101	1-9.7
2 "	3 "	2 "	0.0140	0.0147	—0.0007	1-21
4 "	2 "	3 "	0.0434	0.0460	—0.0026	1-18
2 "	2 "	3 "	0.0082	0.0084	—0.0002	1-42
4 "	4 "	2 "	0.0661	0.0624	+0.0037	1-17
2 "	4 "	2 "	0.0104	0.0090	+0.0014	1-6.4
4 "	2 "	2 "	0.1323	0.1200	+0.0123	1-9.8
2 "	2 "	2 "	0.0208	0.0195	+0.0013	1-15

The comparative accuracy of the old and new formulas will be seen on comparing the ratios of error in tables IV., V., and VI., and table VIII. It should be added, that the results given in table IV. are from calculations made in each instance on sticks which are identically the same, whereas those in table VIII are affected with the errors resulting from the fact that the values of E and C are the mean values obtained from a number of different sticks, which may differ more or less in their mechanical condition. If we take the average values of these constants given in the table for the stick three inches by two inches in cross section, and obtained by taking the deflections answering to the lengths, two feet and four feet, the formula thus obtained gives, for these transverse dimensions and the lengths, two feet and four feet, respectively, four results, the ratios of error of which lie between one fifteen-hundredth and one one-hundred and twentieth.

Let us compare the values of the first and second terms of the formula. This is done in table IX. The values of E and C, taken in the formula, are the individual values for each stick given in the second and third columns of table VII.

TABLE IX.

Sticks.			First term.	Second term	Ratio.	Sum.
l	b	d	in.	in.		in.
4 ft.	3 in.	2 in.	0.00692	0.08952	1-12	0.0964
4 "	2 "	3 "	0.00692	0.03979	1-5.7	0.0467
4 "	4 "	2 "	0.00658	0.0554	1-8	0.0620
4 "	2 "	2 "	0.01000	0.1106	1-11	0.1206
4 "	1 "	2 "	0.01776	0.2681	1-15	0.2858
2 "	3 "	2 "	0.00346	0.01119	1-3.2	0.0146
2 "	2 "	3 "	0.00346	0.00497	1-1.4	0.0084
2 "	4 "	2 "	0.00328	0.00693	1-2	0.0102
2 "	2 "	2 "	0.00500	0.01383	1-2.8	0.0188
2 "	2 "	1 "	0.00990	0.13150	1-13	0.1414
2 "	1 "	2 "	0.00990	0.03301	1-3 3	0.0429

It will be observed that the value of the first term is in general comparatively larger for the length of two feet than for that of four feet; and in two instances is as large as one-half the second term.

If now we divide the first term by the second, we obtain as the general expression of their ratio, $4\,E\,C\frac{d^2}{l^2}$; from which we see that it is proportional to $(\frac{d}{l})^2$. When $_d=\sqrt{4\,E\,C}$, $4\,E\,C\frac{d^2}{l^2}$ becomes equal to unity, and the first term equal to the second. When $\frac{l}{d}$ has a less value than this, the first term is greater than the second. Taking the mean values of E and C, given in the last two columns of table VII., for the first set of sticks, we have $\sqrt{4\,E\,C}=7.41$. The mean values given in the same columns for the second set of sticks, give $\sqrt{4\,E\,C}=7.33$. If, therefore, the length of a white pine stick be less than about seven and one-third times the depth, the deflection from the cause heretofore neglected becomes greater than from the cause to which the whole deflection has hitherto been ascribed. When the length and depth are equal, it is nearly fifty-five times greater; from which it appears that in this case the deflection directly due to the slipping of contiguous vertical laminæ, so greatly preponderates over that directly resulting from the same by reason of the longitudinal strains communicated to the fibres, that the latter is comparatively inappreciable.

It will be seen, from the general expression for the ratio of the two terms, above obtained, that the formula for the deflection may take the following form:

$$f=\frac{P^3}{4\,E\,b\,d^3}(4\,E\,C\frac{d^2}{l^2}+1)$$

I have made, with the same apparatus, a series of experiments on the degree of set, or residual deflection, communicated to sticks by varied strains, and under varied circumstances, and obtained interesting and valuable results. The discussion of these experiments is reserved for another occasion.

The Discovery and Production of Gold in California.

By Professor ROBERT V. SCHLAGINTWEIT.

Translated from the German by ROBERT HEUSCHKEL, M. E.

DURING my stay in California, and during the excursions which I undertook from San Francisco to various parts of that country, so richly cared for and blessed by nature, I had repeated opportunities for making myself acquainted with the different modes of producing gold, there in use. I will try to give in the following lines a description of the procedures, a better knowledge of which may be welcome to many. Being by education no technical miner, I could not rely solely upon my own studies, observations and notes, but had to search for aid in the following works:

JOHN S. HITTEL: The Resources of California. San Francisco, 1868.

FRED. FREIHERR V. RICHTHOFEN: Die Metall production Californiens und der angrenzenden Länder (Ergänzungsheft zu Petermanns geogr. Mittheilungen, Gotha, 1864.)

CARL RÜHL: Californien. New York, 1867.

R. W. RAYMOND: The Mines of the West. New York, 1869.

Short notes about the discovery of gold in California may precede the description of its production.

Upon the ground and property of Captain JOHN A. SUTTER, a gentleman born in Switzerland in 1803, who had settled in 1839 in California, was found on the 19th of January, 1843, on the place where now the town of Coloma is situated, the first gold, in the channel of a small creek, the water of which had been turned off for a projected saw-mill, by one of his foremen, named JAMES W. MARSHALL. By the way, I will mention that PETER WEIMER, a German, claims, whether rightfully or not is doubtful, to have found the first grains of gold. In the spâce of a few years, gold was found in such abundance on SUTTER'S farm, that its value amounted to millions and millions of dollars; but SUTTER, distinguished by his hospitality, liberality and enterprising spirit, and well-esteemed, beloved and held in grateful remembrance by a good many, was no match for the extraordinary circumstances that overwhelmed him, and that should have made him the richest man of the globe. Of the enormous treasures found on his property, he received next to nothing, and the more others enriched themselves, and the more expensive living became, the worse it turned out for him. The man, who had apparently the expectation of so many millions, came by and by to receive with thanks a pension for life, amounting to $2,000 a year, granted by the State of California. Mr. SUTTER, now 67 years of age, lives somewhere in Switzerland; his son, an officer in the United States Army, is stationed now in California, where I chanced to make his acquaintance.

The discovery of gold changed, as if by magic power, the circumstances of California. The entire country was seized by a feverish exaltation. But in consequence of the insufficient communication, it took a long time to make this important discovery generally known.

The first notice was given to the Eastern States by the Baltimore *Sun*, on the 20th of September, 1848, but very little attention was paid to it. Only since the beginning of 1849, the California news began to attract more general attention. During the month of May, the first train of emigrants started from the Eastern States to the far off West. From different places on the Missouri river, between Council Bluffs and Independence, departed at that time about 20,000 men for the new Eldorado. It was the blossom of the American west, young, stout, enterprising men, intermixed with a number of rough elements and convicts, who had just come from prison. This enormous crowd, which could easier be believed to be an army going out desirous of conquest, as all were armed to the teeth, was accompanied by a large number of beasts of burden of all descriptions, and thousands of simple carts, mostly drawn by oxen, destined not so much for the transportation of men as for ammunition and stock, since every one carried provisions sufficient for one year.

The hardships those brave wanderers had to suffer on their voyage, will hardly be believed. Places, inhabited by the whites, were not in existence. Here and there they may have fallen in with a trapper. The more numerous were the redskins, up to that time wholly undisturbed, and throwing difficulties in the path of the white man and showing all kinds of hostility.

Any one who knows by experience, as I do, the indescribable desolate country, the horrible and comfortless desert, that stretches west from the Missouri to the boundary of California, even at the present day, although many improvements have been made since, who regards the difficulties to be overcome in crossing the Rocky mountains, at a time when there were no roads—who imagines that often, for days and for weeks, deserts had to be crossed where there was no water at all to be found, or only a water saturated with alkalies or salts, the use of which produced diseases with men and beasts—who considers, furthermore, the different skirmishes that had to be fought between the members of the expedition and the numerous Indians, both irritated and troubled by the appearance of an army of white men, may be able to form an idea of the unspeakable joy that overcame the new imigrants when they beheld, from the ridge of the Sierra Nevada, the sunny meadows, the bright valleys, and the glimmering sheets of water beneath their feet—the country that was to be henceforth their home, and that should pay for all the trouble and difficulties they had endured, opened before them. But not all could enjoy the sight of the long-looked-for land, that had occupied their dreams by day and night. Sadness overcomes us, when we learn that four thousand dead had marked the way from the Missouri river to the beach of the Pacific Ocean.

What a contrast between that voyage made by the first settlers under so many difficulties, and a trip now-a-days in car of the Pacific Railroad, surrounded by all the conveniences and comforts of life. But not only by land came new settlers to California, but also by sea, on frail, badly-furnished vessels, around Cape Horn. For although the first steamer, "California," arrived on the 20th of February, 1849, at the shores of the north Pacific, it was much later when the first regular line of steamships, via the Isthmus of Panama, was established.

A new life developed itself in California with the arrival of the first immigrants, a life whose romance defies every description. Of course, there was no comfort and none of the conveniences of our civilized life to be had there at that time. But the mania, or apparently the certainty, felt by the emigrants of accumulating riches in a short time, without the least mental exertion, but by simple manual labor, even under privations, strengthened and hardened every one. It made those privations supportable; it taught him to bear hunger and thirst and to stand fatigues, that would have made him shrink in former times.

The hard ground on which the gold-digger, rolled up in a dirty blanket, had to sleep, with no other shelter than the starry sky, was a soft bed for him; beans and bacon, prepared by himself in the greatest haste, a rich meal, particularly when he could wash them down with a cup of tea or coffee.

The men had pursued the most different branches of business, and belonged to the most different grades of social life. Now one is worth as much as the other; everyone has to do everything for himself, everyone is equal to his neighbor, and that not only in a social position, but also in his outside appearance; all look equally rough and savage in their attire, dilapidated by hard labor and uncomfortable life.

During the first months, there prevailed throughout California the most complete anarchy, the entire absence of law, police and judges. The idea of *égalité* and *liberté* was the standard, everyone was incited by the same object—the thirst for gold. But this original and wild condition did not last very long. On the 15th of December, 1849, California formed a State Government, and joined the Union on the 19th of September, 1850. But complete order and security of life and property was not yet established, and before that could be gained frequent outbreaks of rowdyism and lawlessness had to be suppressed by force and energy.

It is a singular fact, that the gold found in those early days, in really enormous masses, only in a very few cases, remained in those hands which had had the labor of digging it. The quantity of gold found was astonishing; without any implements, perhaps only with a knife, sometimes only with a fingernail, was the work prosecuted. To gain gold to the amount of $500 in one day, was not an exceptional case. It was worked out of the crevices of stones, but more frequently searched for in the loose pebbles of ravines. The weekly result of a partnership of two or three, was often divided on Saturday by means of the tin cups. Gold-dust, in ounces or fractional parts of ounces, was exclusively used as payment for other goods, for there was no minted money to be had. Provisions, the value of which depended more or less upon the stock on hand, had to be often balanced with gold, and in consequence of that, not the miner himself, but those who undertook to furnish the necessities of life, turned out the possessors of large fortunes.

[TO BE CONTINUED.]

Railways in Japan.

The London *Railway News* contains quite an interesting article upon this subject, which we place before our readers:

"We bow our head 'one hundred times with profound respect' to TANISHOKEI MENAMOTO NO MARASADA. A century hence, when Yokohama produces its SAMUEL SMILES to record the history of the men who have done good service to their country, he will assuredly give a very high position to the gentleman whose name we have given above, and who is the author of an essay on the 'Introduction of Railways and Telegraphs into Japan,' and of petitions in favor of the same. MARASADA is no ordinary man. He has taken up the question of railways and telegraphs after mature and careful deliberation. He is a close observer and an able reasoner. He has already, as he states in his petition, 'represented his humble views respecting the removal from circulation of the debased currency;' and it is possible that upon this matter he may have arrived at conclusions somewhat more sound than those put forward by our own Chancellor of the Exchequer for sweating the British sovereign. MARASADA has, he tells us, also 'occupied his private leisure in studying the constitutions of foreign countries, and here, too, he is profoundly ashamed.' He has formed opinions which he is prepared to stand by at all risks. 'Your servant,' he says, is willing to undergo beheading, or boiling alive for his opinions. Those who do not know how stupidly honest he is, say that he is carried away by a love of what is new and strange.' Men of progress nearer our own country have been subjected to precisely the same imputation. Hear, however, how the man of progress in Japan puts his enemies to the rout:

"'It is his humble opinion that the old exclusive spirit is still alive, and that the vicious habit of taking superficial views is not yet eradicated. Narrow views, such as might be held by a frog that lives in a well, are daily becoming more and more rife, and they not only find a vent in every day conversation, but are boldly proclaimed in high official quarters. These persons are an obstacle to the progress of civilization, and injure the wealth and power of our country. They do not know that in order to defend ourselves against the foreign barbarians, whom they so much detest, the wealth and power of Japan must be the chief means. Such persons are really anxious to return to the old state of things, when men lived in hollow trees and caves like beasts.'

"While anxious, however, to see great reforms carried out in his country, MARASADA is at heart a good and sound conservative. Were he in this country, he would be classed among the Liberal Conservatives of our political party. 'It is the prayer of your servant,' he writes, 'that the great principles of the constitution may be maintained; that attention be not drawn off to petty advantages or shallow sentimentalities, but that, regardless of the remonstrances of such men, a decisive order for the introduction of railways be given. Then the people of Japan will have placed before their eyes the advantage of this invention, and the proverb that, to see once is better than to hear a hundred times, will be exemplified. When the railway has been constructed, machinery of all kinds can be introduced, commencing with appliances for the cultivation of the mulberry tree, the silk culture, weaving, and for cleaning rice. Thus will a great stimulus be given to production, and foreign gold and silver made to flow toward Japan. If, under present circumstances, the railway project should fall to the ground, from a dislike to the trouble of carrying it into execution, your servant fears that the results to the empire will be calamitous.' Well argued, MARASADA! and your opinions have all the more weight, seeing that they are those expressed by one of the old court nobles of Kioto, from whom, as from the old-fashioned Tories of our own country, such sentiments were by no means to be expected. The opinions of MARASADA are also shared by some other members of the Japanese Government, and a paper just presented to Parliament on affairs in Japan gives us 'An Essay on the Introduction of Railways and Telegraphs into Japan,' and a 'Proposition for the Creation of a Source of Wealth for the Promotion of the Imperial Felicity, and the Establishment of an Unlimited and Everlasting Benefit to the Nation.' The author of this essay complains that 'the energy of the people is on the decline, the national debt is on the increase, and the voice of the poor in their misery fills the streets; the people of the towns through which the high road runs are poor and suffering in their unmitigated misery. Their old parents are neglected, and mothers cannot marry their daughters.' As a remedy for this state of things, railways and telegraphs are suggested, and those who object to the introduction of such new-fangled things, on the ground that they would only astonish our people's eyes and frighten their ears, are compared to persons of narrow views and small minds, who 'look at heaven through a hole in a small bamboo.'

"'I maintain,' writes the author, 'that the future of a country lies in its people, and the way to enrich the people is to encourage the productions of industrial labor. In these efforts the economy of human labor is of paramount importance. This is only possible by the introduction of telegraphs and railways. If a proof for this assertion is wanted, we need only look to the condition of those nations which we now call greatly and highly civilized, say England or France, and a hundred years ago, when they had not been able to overcome the disadvantages of an exclusive employment of human force for labor of all kinds. Since the introduction of railways and telegraphs into these countries a hundred other useful and profitable discoveries have been added; the distance of thousands of miles are now traversed by horses and wagons or boats; in a moment Government dispatches its orders in all directions with celerity and promptness. Thus have the present wealth and power of these countries been created.'

"In conclusion, writes this Oriental philosophical statesman: 'Let us hope that these objects may be obtained, and that they may become the source of our national prosperity, and promote the imperial felicity. We may then say in truth,

that the basis of our independence and liberty as a free nation was the introduction of telegraphs and railways.' A second minute on the advantages to be gained from the construction of railways points out that, if made, places now at a distance would 'become neighbors and, as it were, one continuous street. Aged men, women and children would travel with ease, and trade would become more and more flourishing. In future, chair-bearers, horse-boys, bootmen and inn-keepers will reap the benefit of the increasing prosperity, and they will be able to find some means of gaining a livelihood. For the present, the execution of this great undertaking will afford employment to large numbers of the lower class in Yeddo and the vicinity, and give them the means of supporting themselves. This will naturally accustom them to the idea of a railroad, and thus the way will be prepared for its future extension, as above proposed, to the other provinces.'

"A dispatch from Sir H. PARKES to the Earl of Clarendon, announces the success which has attended these endeavors to enlighten the government on these subjects, by the authorization of the Japanese railways, the capital for which has already been provided in this country. In this dispatch Sir H. PARKES says it is essential to the establishment of a vigorous and compact administration under the new constitutional system, and of equal importance to the interests of commerce and the industry of the people, that improved means of communication should be provided. Japan, unlike China, does not possess navigable rivers; the rate of travelling averages only twenty miles a day, and provinces that are separated by 400 or 500 miles are nearly a month's distance from each other. The two capitals of Yeddo and Kioto, though connected by the best line of road in the country, are a fortnight's distance apart, and the difficulty of transporting rice often exposes one part of the country to scarcity and distress, while another district may be wanting an outlet for its produce. At the close of last year Sir HARRY was informed by the government that they had resolved to construct a railway between Yeddo and Kioto. Their difficulty in making a commencement lay in the want of funds, and this was met by an offer on the part of Mr. H. N. LAY, formerly of China, and who was then visiting Japan, to lend the government £1,000,000 sterling, on the security of the projected line of railway and the customs revenues. This offer was accepted, and Mr. LAY returned to England to raise the above sum, and to engage the necessary engineers for the work. These are to be employed by the Japanese government, under the direction of Mr. LAY, who has the right of superintending the construction of the railway, though all the plans and details have to be approved by the Japanese government. The measure was strenuously contested by the party opposed to progress, and also by those who were unable to appreciate the advantages of the innovation; but the government gave evidence that the question was fairly understood by its advocates, and Sir HARRY now feels assured that the execution of the scheme may be proceeded with, and that, as the chief engineer, Mr. MOREL, has reached Japan, they intend that he shall at once commence to survey the line between Yeddo and Yokohama. In the same dispatch it is mentioned that an experimental line of telegraph, constructed by Mr. BRUNTON, is already working between Yeddo and Yokohama. Many Japanese foretold failure. It was believed the wires would be constantly cut, and in the popular mind the enterprise was connected with necromancy and Christian propagandism. The only injury done, however, has been some hacking of the posts by two sworded roughs; and the single wire is now found scarcely sufficient to meet the demand for the transmission of Japanese messages between Yeddo and Yokohama. Mr. BRUNTON is consequently engaged in putting up a similar line between Hiogo and Osaka."

MINING SUMMARY.

Nevada.

WHITE PINE.

The *News* of July 27th has the following: "We understand that the mills of Silver Park are running on ore from Ely District. The distance between the two points is about forty miles. Ten stamps and a Stetefeldt furnace are being added to the Monte Cristo mill, west side of White Pine mountain. The Manhattan mill has been leased by Gov. BLASDEL to CHAS. S. COOVER—one of the very best amalgamators and mill managers in the State."

BULL RUN DISTRICT.

A correspondent of the Elko *Independent*, writing under date July 26, gives the following information in regard to this district: "Bull Run district lies about eighteen miles south-west of Mountain City, Cope district, and a good free road leads from the latter place to the mouth of the canyon, at White Rock City, in Bull Run district. The country is well wooded and watered, there being at least 20,000 cords of timber in the immediate vicinity of the mines, and an abundance of water within three-quarters of a mile. The most important ledges so far discovered are principally chlorides and sulphuret of silver, which I will mention. The Porter—Two to four feet wide; shaft, 32 feet down; 100 feet further south-west, shaft 25 feet; still further south-west, 380 feet, shaft 12 feet; rich black sulphuret, assays from $4,000 to $6,000 per ton; 20 tons have been shipped to Reno with satisfactory results. Central—Shaft, 12 feet wide; black sulphuret; lode, four feet wide; assays $4,000 per ton. Revenue—Shaft, 8 feet; lode, four feet wide; chloride and black sulphuret; two tons on dump, average assay, $150. Montana—Lode four feet wide; shaft, 16 feet; chloride and black sulphuret; assay, $150. Fountain Treasure—Shaft, 30 feet; chloride and sulphurets; assay, $160 per ton. Blue Bell—Six feet wide; shaft, 18 feet; will mill $100 per ton. Nevada—Located for two miles; four to six feet wide; shaft, 18 feet; mills $100 per ton. This is eminently a self-sustaining mining camp, there having been no necessity for calling in the aid of capital, and the holders preferring to develop their own mines, and demonstrate their value, the ledges being of a permanent character and the grade of ore so high that they have paid from the commencement. From the proceeds of the mines the holders have been able from the first to supply themselves with tools, provisions, and all the comforts of life. There are about 200 people at the mines at present, which number will soon be largely increased.

STATEMENT OF THE YELLOW JACKET COMPANY.

An abstract of the report presented by the secretary of the Yellow Jacket Mining Company at the recent annual meeting at Gold Hill, Nevada, shows the receipts for the year to have been as follows:

Bullion product	$1,702,726
Ore sold	10,254
Morgan mill	65,929
Assessment No. 12, levied July 19	240,000
Assessment No. 13, levied November 26	120,600
Assessment No. 14, levied March 16	168,000
Advertising balance	318
Sotal	$2,307,227

The disbursements amounted to $2,028,331. We give the principal items, as follows:

Indebtedness as per last report	$305,606
Labor at the mine	340,500
Mine supplies	51,748
Improvements in hoisting works	14,485
Legal expenses	3,852
Revenue stamps, advertising, etc	5,278
Candles and oils	12,112
Wood	58,103
Timber	85,748
Crushing ores—outside mills	769,342
Crushing ores—Company's mills	272,849
Assay, discount on bars and Federal tax	30,988
Interest	30,491
Salary of officers	16,200
Working tailings—Company's mills	10,179
Miscellaneous	20,880
Total	$2,028,331

The assets of the company aggregate $285,102, as follows:

Cash in Bank of California	$119,609
Mine supplies	16,691
Mill supplies	15,747
Due on assessments Nos. 1 to 14	1,135
Due on $160,000 advanced to V. & T. R. Co	129,057
Sundry open accounts	2,8 3
Total assets	$285,102
Liabilities	6,206
Assets above liabilities	$278,896

The above figures represent the condition of the company at the close of the fiscal year ending June 30, 1870. No dividends were disbursed. The apparent profit for the year was $584,502, of which $305,606 was used to liquidate an indebtedness at the beginning of the year, while the remainder represented the surplus assets at the close, of which $119,600 was in cash. This is a better exhibit than has been made by some of the claims on the same lode. Nevertheless it is unsatisfactory to stockholders, since, in addition to the entire receipts from bullion and other sources, $528,000 was required from them in assessments, to bring about the state of things set forth in the foregoing statement. It will be noticed that the receipts from bullion and ore were about $1,713,000, to produce which $1,722,726 was disbursed. Not a very profitable business.

THE EUREKA DISTRICT MINES.—A NEW IMPETUS TO MINING.

A correspondent of the San Francisco *Morning Call*, writing from Eureka, Lander county, Nevada, July 22, 1870, says: The purchase of the Buckeye property, a few days since, by a party of San Francisco capitalists, has given this place quite a start, and activity and bustle in prospecting and opening up new mines are the order of the day. Last November, but little was known of Eureka. Col. D. E. BUEL passed through this canyon in that month, and was induced to bond the Buckeye and Champion mines, then only just located. Testing the ores in a little furnace which Mr. STETEFELDT had built and abandoned, Col. BUEL found that the ores worked easily, and produced a lead rich in bullion. Arrangements were soon made to erect large smelting works, and a company was formed, consisting of BUEL, BATEMAN, ALLEN, INGOLDSBY, and FARREN, and called the Bateman Association, who took the matter energetically in hand. Col. ROBBINS, the representative of a New York company, was about the same time attracted to Eureka, commenced putting up smelting works, and bought the Mountain Boy and Kentuck mines. The success which attended these earlier works encouraged them and others to go more extensively still into smelting operations, and by the middle of April last there were seven furnaces in full blast, and all producing lead bullion of a high grade.

THE RESULT OF THE SMELTING WORKS.

On the 30th of June, the results of smelting in Eureka were as follows:

Bateman Association (two furnaces) had produced 373 tons, average value $348 per ton	$130,152
Marcelina Mining Company, of San Francisco, 200 tons, average value $350	70,000
McCoy Furnace, 110 tons, average value $450	49,500
Buttercup Mining Company, of New York, 100 tons, average value $375	37,500
Wallace & Bevan, of Philadelphia (two furnaces), 75 tons, average value $350	26,250
Total, 959 tons	$313,402

Thus showing that the large quantity of 859 tons of lead bullion, with an aggregate value of $313,402 has been produced by this district in the first six months of smelting, the major part having been actually produced, however, during the last three months.

CONSOLIDATION.

No sooner had Mr. WM. LENT effected the purchase of the Buckeye property, which consists of six locations, than he effected a consolidation with the Bateman Association, thus uniting one of the largest properties in the State. The new company, known as the Eureka Consolidated Mining Company, now holds the following mines: the Buckeye, Champion, Sentinel, Central, Rosebland, and Mammoth, together with the smelting works erected by BUEL & BATEMAN, which consists of two furnaces, each carrying a capacity of twelve tons of ore daily; the blast is supplied by a No. 7 Sturtevant blower, with a forty-horse-power engine. The company have been running chiefly on Champion ore, which is so easily mined that the whole cost of mining and hauling a distance of one mile and a quarter is only $4 25 per ton. In the fifty-six days immediately preceding the 30th of June, they smelted 765 tons 368 pounds of ore, which gave 238 tons of bullion, gross returns, for which, from New York, gave $348 per ton. The quantity of charcoal consumed was 25,832 bushels, worth 30 cents per bushel, delivered. From these figures it will be seen that it took about three and a quarter tons of ore to make one ton of bullion, and required say thirty bushels of charcoal to smelt one ton of ore. Ores from some twenty-five or thirty other mines have been smelted in the various furnaces, and the results show about the same figures. It may therefore be safely noted that in the Eureka District three and one-quarter tons of ore make a ton of bullion, and thirty bushels of charcoal are required to smelt one ton of ore.

DESCRIPTION OF THE MINERAL BELT.

The mines thus far opened lie, for the most part, within the limits of a tolerably well-defined mineral belt, running mainly in a north-westerly and south-easterly direction, and carrying an average width of say one mile and a half. The ores consist chiefly of silver, gold, lead, iron, antimony, and zinc, are easily fusible, and yield a superior article of lead bullion. The mineral belt is found between a range of lime-rock, and here and there are ledges of quartzine and silicified limestone running across the belt, and cropping out sometimes as high as twenty-five to thirty feet. All the mines thus far opened show smelting ores, though there are said to be milling ores in Secret Cañon, which, however, require roasting.

The mines which are being actively worked are the Buckeye and Champion series, the Tiptop, Great Republic and Tennyson, all of which are adjoining the Buckeye property; the Jackson, Adams, and Farren, Fulton, Cambria, and Justice, all in a cluster, forming the continuation of the Buckeye belt; the Hometicket, Lord Byron, Dunderberg, Connelly, Accidental, Badger, El Dorado, Santiago, and Manhattan. All these show good smelting ores, and are, unquestionably, fine mines.

MERITED REPUTATION.

All that has hitherto been effected in this district has been done in a quiet and safe manner, without any puffing or advertising. What Eureka is to-day has been attained simply on its own merits.

PRITCHARD.

Michigan.

THE COPPER MINES—DESTRUCTIVE FIRE—THE CALEDONIA MINING COMPANY'S STAMP-MILLS ENTIRELY CONSUMED.

WE learn from the Ontonagon *Miner* that, on the night of August 4, about 11 o'clock, the Caledonia mine stamp-mill was entirely consumed by fire. The loss is about fifty thousand dollars. This is a most severe calamity to the general mining interests of the country. There was also about five tons of stamp copper in process of treatment at the time of the fire. Almost all of this proves a loss. The insurance on the mill was $18,000; on the rock-breaker, $1,000.

THE NATIONAL MINE.

The *Miner*, of August 6, has the following account of this mine: "The National mine, just at present, seems to have a fair stock of mass work in sight. Some twenty-seven tons have been lately thrown down. During last week a mass weighing about eight tons was blasted away. This mass work is found in the conglomerate, in the bottom of the mine, over the eleventh level. The mass blasted away weighed something over twenty-seven tons. Notwithstanding this good streak, the mine reduced its force by discharging a number of miners and surface men at the close of last month. We might remark in justification of this course pursued by the National, that the mine had employed extra workmen as boss machinist, carpenter, surface captain, blacksmith, etc. It was thought unnecessary to pay these men the wages they should have while so small a mining force was employed, and they, therefore, were relieved from duty. But four miners were discharged, but ten miners are now employed. We have not learned whether further reductions take place in the fall or not, but probably as long as the mine pays its own way, the able superintendent will continue, under instructions of the Board of Directors, to work at least the present force. The mine sent forward a mass weighing 15,500 pounds on Thursday, for shipment. They still have two large masses which will be sent forward without delay. One weighs 16,180 pounds, and the other 14,340 pounds. The product of the mine for the month of July is given as follows: Mass work, fifteen tons and 520 pounds; barrel work, 320 pounds; stamp work, seven tons and 1,055 pounds: a total of twenty-three tons and 395 pounds."

NEW IRON DISCOVERIES.

THE Grand Traverse, Michigan, *Herald*, publishes a communication from A. A. WADSWORTH, employed as assistant in the geological survey of Michigan, in which he speaks of the newly-discovered fields of iron ore, existing on the Manistee river of the Upper Peninsula. As to the extent of these iron deposits, explorations as yet being limited, he cannot report in full; but from personal observation, he reports their existence on the affluents of the Eanistique river, not in extent by square miles, but by tonwships—bog ore, practically inhexhastible in quantity, and in quality equal to the far-famed "low moor Scotch ore." A partial analysis of the ore gives promise of valuable qualities, and a good yield of iron; and experts, who have examined it, pronounce that it will be of great value to mix in smelting with the ores of Marquette and Escanaba river. Tons of the ore in a windfall can be seen hanging to the roots of upturned trees. Mr. W. says he can designate a track for a railroad of twenty miles extent, where the track can be ballasted with iron ore as the cheapest available material, taken from each consecutive mile of that distance, and reaching into the upland ore of the highland. The points of shipment of ore from the region referred to will be from harbors on Lake Michigan, east of Escanaba.

Colorado.

GOLD SHIPMENTS.

The shipments of gold by the three banks of Central for the month ending July 31, 1870, are, says the *Register*, as follows:

	Currency value.
Thatcher, Standley & Co	$49,850
J. B. Chaffee & Co	49,000
Rocky Mountain National	40,150
Total gold shipment	$139,000
Coin value of same, about	$120,000

"During the month THATCHER, STANDLEY & Co. shipped $3,450 currency value in silver bars; coin value, $3,000. Total coin value of gold and silver shipments for the month, $123,000. Three-fourths of the gold came from Nevada district. The largest shipments were made by the Bobtail and Grass Valley companies. Considerable gold was offered by ALEX. CAMERON, from North Clear creek. The aggregate monthly production continues to be about the same as last year, and this with the best mines of the country in absolute idleness."

YANKEE BLADE COMPANY.

A correspondent of the Georgetown *Miner* gives the following information in regard to this mine: "A pleasant ride over Cache creek park brings us to the Arkansas river, on the eastern bank of which stands Granite, the county seat of Lake County, and the centre of much mining industry in the form of the development of the free gold lodes of Granite district. One of the prominent objects of interest to the visitor is the mill and mine of the Yankee Blade Mining Company, a New York organization, mining on the Yankee Blade lode. The mill is situated about half a mile above town, and has twenty stamps busily engaged in crushing the ores of the company. The gold in the ore is free, and is obtained with little trouble; battery amalgamation with blanket sluices, the tailings from which are treated in pans, suffices to work the ores up to a high percentage. To give an idea of its value, we would state that of a lo

of forty cords treated during the past Winter, the average yield was 23½ ounces per cord. The mill has been running steadily all Winter (by steam-power), and is now running on second-rate ore, which yields an average of eight ounces per cord. During the Summer water-power is used, thereby causing much saving in mill expenses. Major HARRY HILL, the superintendent of the company, was absent at the time of our visit, and to the kindness of CHARLES HILL and F. MCCONNELL, the able managers of the mill, we are indebted for many kindnesses in the way of specimens and information. The Treasury Mining Company were running their mill, of fifteen stamps, using water-power, and we believe with good results. The Hayden mill, of nine stamps, also a water-power mill, was idle. Granite is a well-located town, backed up with good mines, and we can see no reason why a future of prosperity is not before it and the mining district of which it is the centre.

California.

IMPORTANT MINING ENTERPRISE IN NEVADA COUNTY.

THE *Transcript* of August 12 says: "We learn that Messrs. EDDY, BELL and others interested, have about perfected arrangements for running a tunnel from the South Yuba side of the ridge to their claims near French Corral. The tunnel will be 2,000 feet in length, having a width of ten feet, and will be run on a level to drain all of Empire Flat, and the most of Kate Hays Flat. The tunnel will open a bed of rich cement gravel forty feet in depth and covering many acres in area. The projectors have had offers from reliable parties to run the tunnel for fifteen dollars a foot, and they may probably get the work done at a less rate than that. The intention is to have two flumes put down the entire length of the tunnel, and extend them as far beyond the mouth as may be desirable, as there is plenty of fall for dumps and undercurrents. By this means they calculate that the cement, which they have been crushing in stamp mills, will be completely disintegrated and the gold set free. The enterprise is one of the most important in its prospective results of any ever undertaken in the county. The ground opened would yield gold somewhere up in the millions.

THE SALT INTERESTS IN ALAMEDA COUNTY.

"Between the towns of San Leandro and Harrisburg, says the *Mining Press*, "There are immense fields of marsh land, mostly grown over with grass, with many natural, shallow ponds or basins of considerable extent, and which are under water at high tide. These flats are divided by several streams, which are navigable for small vessels at high tide. The clayey, compact nature of the adobe soil is admirably adapted to the clean deposit and easy gathering of the salt. In preparing these basins for the manufacture of salt, it is only necessary to throw up small dykes from one to three feet high. Several flats are so inclosed, of such size as may appear convenient, and communicating with each other. The water is first let into one of these, where it is allowed to settle and evaporate for several days, when it is conducted into a second basin, and evaporated by the sun and wind until it is a strong brine and commences to deposit salt; then it is turned into a third pond, where it remains until the water is all dried out and the salt is ready to be gathered up. The salt is then scraped together into convenient piles with wooden implements and shoveled into cars that are run upon moveable plank tramways to some convenient point, where it is put into gunny-sacks and carted to the ware-houses to await shipment to San Francisco. This business of collecting salt has been followed here for some years, and it is increasing in importance every year. There were shipped to San Francisco something in the neighborhood of 6,000 tons from these salt fields last season, and there will probably be one-third more produced this year.

"Mr. JOHN QUIGLY, of Alameda, who owns quite extensive salt basins, informs us that this year, during the month of June, the drying weather was unusually advantageous for salt-making, and that the month of July was not so good as it generally is, owing to excess of moisture in the air. The best months for evaporating are generally August and September. We would here suggest the propriety of some measures being taken by our Agricultural Institute to keep a record of the daily evaporation in these salt basins, to be noted with effects on vegetable growth, etc.

"The best crude sea-salt is far from being pure. Pure salt is composed of sodium 39.3 and chlorine 60.7 to one hundred parts; while unrefined sea-salt contains, in addition, bromides, sulphates, silicates and carbonates of the bases—lime, potassa, magnesia, etc. The salt produced in Alameda county is remarkably free from sand, as the shores are marshy and the winds favorable. The price of salt by the ton averaged the producers about $9 last year, ranging from $7 50 to $13. It is $8 to $9 at this season at the landings."

THE BORAX COMPANY.

The Lower Lake *Bulletin* learns that the California Borax Company are about resuming operations after an inactivity of two years or more. The Borax Lake is quite low, owing to the evaporation induced by the extreme heat this summer.

Missouri.

THE IRON BUSINESS.

A CORRESPONDENT of the Indianapolis *Journal of Commerce*, writing from St. Louis, August 4, says: "The iron business of southeast Missouri shows little change since my last. The demand for iron land has been good, and some extensive sales of black oxide ores have been made below the Pilot Knob, and a number of hematite beds have changed hands near Frederickstown, on the Belmont branch. A number of new discoveries have been made south of Ironton, among which is a deposit of a beautiful micaceous ore, which promises to be exceedingly valuable. The samples which I have examined indicate an ore of average richness and very ductile. A promising quarry of marble and a large bed of emery have been discovered. I learn that the Mine La Motte works have just completed a furnace for melting copper, which is abundant on their track; they are also building reduction works, for the purpose of reducing their ores of nickle. The St. Louis iron men say the trade n pig iron is dull. The Lewis Furnace Co., Carondelet works, South St. Louis Co., and Kingsland Iron Co., are each running, but they do not seem disposed to push their business, as was the case some months since. Those who have the ability, and will take the trouble to examine into the matter, will soon be convinced that the business of making pig iron is not the most profitable business in the world, notwithstanding the senseless twaddle of the 'free traders.' The new rolling mill at Carondelet is progressing finely, and will, when completed, be one of the most extensive establishments in the country, if not in the world. The iron men of Missouri have lost one of their most valuable members in the death of JAMES HARRISON, President of the Iron Mountain Company."

New York.

DISCOVERY OF AN IRON MINE.

THE Oswego *Times* says: "During last week a rich deposit of iron ore, believed to be very extensive, was discovered on the farm o JAMES SWARTOUT, Esq., located about two miles west of Sterling Centre, and considerable excitement has been aroused in the locality over the promise of great benefit to all landholders there. A Pennsylvania gentleman, extensively engaged in the iron-mining in that State, has arrived in Sterling, and has leased Mr. SWARTOUT'S farm, and Mr. HUME'S farm adjoining, and is already excavating with the design of commencing extensive mining operations, being fully assured that the deposit is one of the richest in the country. The ore lies at an average depth of from four to ten feet below the surface, and no time is to be lost in bringing the newly-discovered mineral wealth of Sterling into requisition. The people of the town already indulge the most enlarged views of immediate wealth and importance, and any amount of manufacturing enterprise is talked of. The discovery is also of great importance to Oswego, and will speedily give an impetus to manufacturing enterprise here, and perhaps hasten the construction of the end of Lake Shore Railroad, the line of which passes directly through the iron district."

ON DIT ABOUT MINES AND METALS.

New Lake Superior Iron Mine.—According to the Negaunee *Mining Review*, the Winthrop is the name of a new mine being opened about halff a mile east of the New England, under the superintendence of Captains RICHARDSON and WOOD. The land is owned, we believe, by Messrs. A. B. MEEKER, of Chicago, and A. G. CLARK, of Marquette. The ore is mostly the hematite, the same as the New England.

Another Big Nugget was found a couple of months ago at Berlin, in Victoria, Australia. According to a correspondent, its weight was 96lb. 5oz. 15dwt.; length, 12 inches; height at highest solid part, six inches; at lowest, four inches; circumference of centre, 16½ inches; circumference of small end, 13 inches; of large end, 19 inches; circumference lengthwise, taken by the sides, 32¾ inches; by the top and bottom, 28 inches.

Coal Mining Profits.—M. LACRETELLE states that the consumption of Prussian coal is increasing in France more rapidly than that of English coal, while English coal appears to be gaining favor among the French rather more rapidly than Belgian. M. LACRETELLE estimates that the amount of capital set fast to secure the production of each ton of coal raised in France is £1 4s. Taking an average of eleven years from 1855 to 1866 inclusive, M. LACRETELLE states that the Aniche mines yielded an average profit 3s. 2d. upon each ton of coal extracted. Of this 3s. 2d. per ton, 1s. 11d. per ton found its way into the pockets of the proprietors of the mines in the shape of dividends, and the balance was applied to first establishment expenses.

The Western Iron Company's Furnaces, situated at Knightsville, Indiana, embrace two furnaces and a rolling mill, situated about a quarter of a mile south of the railroad. The company own about a half a mile of switches. The capital stock is $300,000. The stockholders are men of reputed wealth. Work was commenced April, 1867, and the first furnace was put in blast October, 1868. They have two upright engines of large power. It is estimated that forty tons of pig iron per day are smelted. The furnace and mill employ two hundred men. Common laborers receive $1 75 and $2 per day; puddlers, $4 50 and $5 50—the head puddlers and heaters receiving $6 50 and $7 50. Two hundred and twenty-five tons of coal per day are used in the mill and furnaces. Missouri ore is used by this, and most of the other Indiana furnaces.

Coal Mines in Belgium.—One hundred and twenty thousand men are employed in Belgium as colliers. Their average earnings are about seventy cents a day, or one hundred and eighty-two dollars a year. The average wages of all employed in and about the collieries, including women and children, is only about fifty cents a day, or one hundred and forty-two dollars a year. In the case of the colliers, contributions amounting to $3 30, or two per cent. of their gross earnings, have to be paid yearly. The quantity of coke exported from Belgium in May last was 322,628 tons against 271,589 tons in May, 1869, and 337,573 tons in May, 1868. In the five months ending May 31, this year, the coal exports of Belgium amounted to 1,511,506 tons against 1,402,629 tons in the corresponding period of 1868. France absorbs almost all the spare coal of Belgium, having taken in the first five months of this year 1,453,448 tons against 1,345,219 tons in the corresponding period of 1869, and 1,354,721 tons in the corresponding period of 1868.

New Iron Discovery.—The Grand Traverse, Michigan, *Herald*, publishes a communication from A. A. WADSWORTH, employed as assistant in the geological survey of Michigan, in which he speaks of the newly-discovered fields of iron ore, existing on the Manistee River of the Upper Peninsula. As to the extent of these iron deposits, explorations as yet being limited, he cannot report in full; but from personal observation, he reports their existence on the affluents of the Manistique river, not in extent by square miles, but by townships. Bog ore, practically inexhaustible in quantity, and in quality equal to the far-famed "low moor Scotch ore." A partial analysis of the ore gives promise of valuable qualities, and a good yield of iron; and experts, who have examined it, pronounce that it will be of great value to mix in smelting with the ores of Marquette and Escanaba river. Tons of the ore in a windfall, can be seen hanging to the roots of upturned trees. Mr. W. says he can designate a track for a railroad of twenty miles extent, where the track can be ballasted with iron ore as the cheapest available material, taken from each consecutive mile of that distance, and reaching into the upland ore of the highland. The points of shipment of ore from the region referred to will be from harbors on Lake Michigan, east of Escanaba.

A Nineteen Thousand Dollar Chunk.—The monster nugget was found recently almost within gunshot of the town of Auburn, California. The *Stars and Stripes*, a paper published in Auburn, says in relation to it: "It was found upon or near the surface, with almost equal bulk of gold and rock visible, in Baltimore ravine, which was supposed to have been worked over and over, from mouth to head, dozens and dozens of times, and which has as often been deserted and considered exhausted, to have work resumed and renewed successes, time after time and year after year. For more than twenty years, industrious and intelligent miners, including those of all races, creeds and colors, have delved and dug along Baltimore ravine; it has yielded many big chunks, and many thousands and tens of thousands of coarse gold, but here, almost in plain sight, right within reach, has all the while lain this huge specimen only nine pounds of rock to ninety-seven pounds of pure gold, worth over nineteen thousand dollars! The finder is an Austrian, hitherto indigent, and earning a precarious livelihood, who, we are informed, has never paid a dollar of tax in the State. This incident, like many of similar character that have occurred in this vicinity, verifies the maxim that 'it is better to be born lucky than rich.'"

MISCELLANEA.

Good Idea.—It is said that the Chinese only pay their physicians when they are in perfect health. As soon as they get sick the pay of the doctor ceases, and it is, therefore, for his interest to cure them as quickly as possible.

Another Mountain Railway.—The proposed railway over the St. Gothard Mountain is just now causing a great stir in Europe. Italy has voted $45,000,000 towards it. Switzerland votes $20,000,000, North Germany $10,000,000, and even little Baden votes 3,000,000 francs for its construction.

Turkish Engineering.—The materials for the construction of an iron bridge at Karakelli, which the Campagnie des Forges et Chantiers de la Mediteerranee contracted to supply for £133,000 (Turkish) having recently arrived, the work of putting together the new structure in the inner harbor has been commenced. A difficulty has, however, arisen from an insufficient number of pontoons having been provided by the arsenal, and the result is likely to be considerable delay in the completion of the work.

A valuable improvement in navigation will be the proposed deepening of the channel of Providence river, at the Crook, from the present mean low water depth, say 6½ feet, to 14 feet, in a channel 75 feet wide. The work is under the direction of G. K. WARREN, of the Engineers, one of the most accomplished officers in the world. There is a large coal traffic into Providence from Philadelphia, to supply Massachusetts railroads and factories. The same officer has charge of the construction of a breakwater at Block Island.

A Puzzling Possibility.—When the Russian-American Telegraph is completed, the following feat is possible: A telegram from Alaska for New York, leaving Sitka, say at 6:40 Monday morning, would be received at Nickolaef, Siberia, at 6 minutes past 1 on Tuesday morning; at St. Petersburg, Russia, at 3 minutes past 6 Monday evening; at London at 22 minutes past 4 Monday afternoon; and at New York at 46 minutes past eleven Monday forenoon. Thus, allowing 20 minutes for each re-transmission, a message may start on the morning of one day, to be received and transmitted the next day, again received and sent on the afternoon of the day it starts, and finally reach its destination on the forenoon of the first day. The whole taking place in one hour's time.

A Novel Vessel.—A model of a sea-going vessel of very original build is now to be seen in the port of Algiers. A general idea of the construction is obtained if we imagine a steamer cut in two, and the several parts made the supports of a bridge four times the length of the original vessel. This bridge has an air-chamber of its entire length, so that if by accident it should become parted from the supports it cannot be submerged. It is destined for the cargo, but cabins, in the form of boats, are so arranged along the sides of the bridge that in case of accident to this latter they may be navigated separately. Thus, there are three chances of safety if the structure goes to pieces. The supposed advantages are, first, great speed (since the larger part of the vessel, not being in contact with the water, the resistance is so much diminished,) safety, and great space for cargo. Something of this kind has been projected for taking railway trains across the Channel, but we do not remember to have seen it suggested for vessels going a long distance.

Purification of Water.—On the lower Maas, in Germany, the only water obtainable is that of the river, which affects persons unaccustomed to drink it very injuriously. Yet, strangely enough, the most searching analytical and mycroscopical examination failed to detect in what consist the deleterious elements. On the supposition that the unhealthiness of the water proceeded from the solid matter suspended in it, and which did not even disapper after long standing, Dr. GUNNING succeeded in entirely disinfecting the water by means of chloride of iron. For every two pints of water there are taken 0.032 grammes of the dry chloride of iron, dissolved in distilled water; the whole is well stirred, and suffered to stand thirty-six hours, at the end of which time a flocculent precipitate will have formed. To insure the neutralization of any hydrochloric acid that may be formed, 0.085 grammes of crystalized soda to two pints of water may be added. This method of purification has been thoroughly tested, and is easy of application to any well-water containing organic matter.

Electric Ship-lights.—Electric-light apparatus, which for some three or four years has been the subject of successful experiment in the French navy, has now been introduced on board the French transatlantic packets, and been found extremely useful on dark nights and foggy weather. A similar apparatus has been placed on board the iron-plated frigate *Heroine*, and the whole of the fleet will before long be fitted with them. The maker of them has also received a similar order for these lights from the Russian Government. The apparatus, which is placed at the head of the vessel, consists of an electric light with a powerful reflector. The light is produced by an electro-magnetic machine, set in motion by a donkey-engine. The reflector is on the Fresnel system, like those employed in lighthouses. Its use is to illuminate the horizon in foggy weather, or any point of the coast on which it is intended to make a descent at night. The light is sufficiently powerful to bring out any point of the coast with perfect clearness at a distance of two miles, while, at the same time the ship would be entirely invisible from the shore, unless, indeed, it was made perceptible with the of some well-arranged reflecting surface or medium.—*American Artisan.*

Strength of the New York Trades-unions.—The following tables of the unions in New York city shows their strength and means quite correctly:

NAME.	UNIONS.	MEMBERS.	FUNDS.
Clothing trade	7	6,979	$ 5,000
Building trade	21	16,325	20,000
House-furnishing	20	11,217	5,000
Food producers	9	4,905	10,000
Shipping trade	7	14,100	7,000
Publishing trade	11	3,000	1,500
Metal workers	6	2,850	2,000
Laboring	8	8,350	1,500
Miscellaneous	6	2,500	5,000
Total		70,226	57,500

The strongest and most important unions are the Crispins and the coal miners. They are strongest in Massachusetts and Pennsylvania. There is, fortunately for all parties concerned, an increasing desire among the unions to try the co-operative solution. The iron-founders in Pennsylvania, at Troy, New York, and at Cleveland, Ohio, and the Crispins in Massachusetts, California, and New Brunswick, and the tailors in New York city, are all trying important experiments by enterprises of the co-operative character. The leading minds of the St. Crispin Order have dreamed the magnificent dream of endeavoring to convert that whole trade into a self-employing and co-operative movement and effort.—*New York World.*

MARKET REVIEW.

The Coal Trade.

NEW YORK, August 26, 1870.

WHOLESALE.—The event of the week is the Pennsylvania Coal Company's circular for September delivery at the following prices, f. o. b. at Newburgh, to monthly contractors:

Lump	$5 00	Egg	$5 30
Steamboat	5 00	Stove	5 50
Broken	5 20	Nut	4 70

which is an advance of about 30 cents per ton over the previous month's prices. Coupled with this advance at wholesale is a retail advance of 50 cents per ton, making the present price of Pittston Stove, $7 00 per ton. This movement on the part of this company is not without its influence upon the general market, and coal is moving in fairly active demand at our current quotations. Schuylkill, Broken and Chestnut sizes, is in rather over supply upon this market for the moment, and calls are made below our quotations. This is mainly occasioned by the scarcity of vessels at Boston for New England ports, which has occasioned increased shipments to New York City.

The next Scranton auction is announced for next Wednesday, and the prospects of prices are freely discussed in trade circles this week. We judge from all we can gather, by listening to the story of "the bulls and the bears," that there is not likely to be much if any change from the prices realized at the last sale.

An advance in Reading tolls, or rather a reduction of the drawback on tide-water shipments, which at present is 80 cents per ton, will probably be announced on September 1st. It will be, from all we can learn, equal to an advance in tolls of 48 cents per ton. The present rate of tolls and freights from Pottsville to New York is $2 55. With this advance it will be over $3 00 per ton. It does not seem possible in the face of this advance, that Schuylkill coal can be any lower than it is at present offered at; and whilst we do not look for much higher quotations, we repeat the advice we gave to retailers and consumers not to hesitate to buy now, as we believe this is the surest way to prevent any speculation in prices when the fall trade sets in.

Vessels continue moderately plenty to all Eastern ports, and freights are unchanged.

AT RETAIL.—The advance in Pittston coal to $7 has had a very good effect upon the market. Schuylkill coal has been advanced from $7 to $7 50, and the dealers are doing a moderately active business. Consumers are becoming satisfied that coal will be no lower, and are purchasing more freely.

PHILADELPHIA.—The market is not very active except on New York orders. Freights are firm.

Anthracite Coal Trade for 1869 and 1870.

The following table exhibits the quantity of Anthracite Coal passing over the routes of transportation for the week ending August 20, 1870, compared with week ending August 21, 1869.

COMPANIES.	1869. WEEK.	1869. TOTAL.	1870. WEEK.	1870. TOTAL.
*Phila. & Reading R.R.	97,598	2,137,926	102,312	1,524,810
Schuylkill Canal	10,640	437,660	20,369	108,358
Lehigh Valley R. R.	44,391	1,429,604	49,529	1,594,213
Lehigh & Sus. R. R.	20,331	474,216	21,252	613,635
Lehigh Canal	37,288	418,439	23,884	376,176
Scranton North	616	206,572	23,405	465,628
" South	4,471	622,173	33,710	1,122,405
Penn. Coal Co., rail	23,304	604,495	21,032	719,178
" " " canal	119	10,714	358	11,832
Del. & Hud. Canal Co	13,227	650,305	50,496	9-3,774
" " " R.	97	102,866	8,01	297,947
" " " south		51,471	7,356	250,399
Shamokin	15,146	244,638	14,259	293,240
Trevorton	1,734	14,574	2,318	53,150
Lykens Valley Coal Co.	1,558	43,220	5,715	76,573
Wyoming South	11,794	169,965	9,477	179,126
Wyoming North	5,552	13,218		
P. N. Y. C. & R. R. Co.			5,076	190,391
Williamstown, Col'y	6,511	116,079	6,956	165,201
Short Mountain				
Total	234,427	7,759,808	401,072	9,447,906
1869			294,427	7,759,808
Increase week and year			109,645	1,688,098

* Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1869 and 1870.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Aug. 20, 1870, compared with week ending August 21, 1869.

COMPANIES.	1869. Week.	1869. Year.	1870. Week.	1870. Year.
B. & O. R. R.	25,466	681,410	19,477	587,763
C. & O. Canal	29,784	403,370	15,566	380,171
H. & B. T. R. R.	6,429	217,478	....	179,848
Harrisburg & D.	14,267	....	15,166	494,940
L. V. R. R.	....	....	....	9,389
P. & N.Y. C. & R. Co.	....	....	5,551	157,136
	....	....	....	....

Schuylkill Coal Trade.

Report of Coal transported via the P. and R. R. for the week ending Aug. 18, 1870—less coal carried for Company's use, and Bituminous Coal:

For week	102,312 16
Previously this year	1,422,498 19
Total	1,524,811 15
Same time last year	2,137,926 12
Decrease	613,114 17
Amount sent same week 1869	97,598 03

Amount of coal transported on the Philadelphia and Reading Railroad for the week ending Thursday, August 18, 1870:

From St. Clair	36,230 14
" Port Carbon	6,161 05
" Pottsville	5,016 17
" Schuylkill Haven	53,825 05
" Auburn	5,639 05
" Norristown	— —
" Port Clinton	14,852 04
" Allentown and Albertis	388 06
" Harrisburgh and Dauphin	13,166 15
Total paying freight	115,479 11
Coal for Company's use	3,024 00
Total for week	118,503 11
Previously this year	1,928,011 06
Total	2,046,514 17
To same time last year	2,519,863 1/4

Report of coal transported over the Schuylkill Canal for the week ending Thursday, August 18, 1870.

	Tons. Cwt.
From Port Carbon	— —
" Pottsville	— —
" Schuylkill Haven	19,076 10
" Port Clinton	1,293 00
Total for week	20,369 10
Previously this year	87,959 00
Total	7,959 00
To same time last year	437,600 14

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company, for week ending Saturday, Aug. 20, 1870.

	WEEK.	SEASON.
North	42,049 18	1,433,811 00
South	7,357 19	290,399 17
Total	49,407 17	1,724,210 17
Corresponding time in 1869.		
North	2,749 10	722,876 16
South		49,457 04
Total	2,749 10	772,334 00
Increase North	39,300 08	Increase 710,934 04
Increase South	7,357 19	Increase 240,942 12
Total Increase	46,658 07	Increase 951,876 17

Report of Coal Transported over Lehigh Valley Railroad

For the week ending August 20, 1870, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREV'LY. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	9,268 12	417,183 11	426,446 16
" Hazleton	38,540 16	1,351,124 08	1,389,670 11
" Upper Lehigh	261 09	9,211 14	9,473 03
" Beaver Meadow	13,897 01	488,023 07	501,920 08
" Mahanoy	7,463 15	156,394 02	163,857 17
" Mauch Chunk	67 03	447 17	515 00
Total Anthracite	69,498 16	2,422,384 19	2,491,883 15
Bituminous Coal recv'd from Cata. R. R.			
N. C. R. R.			
E. P. R. R.		9,380 00	9,380 00
P. & N.Y. C. & R.R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	69,498 16	2,431,764 19	2,501,263 15
Same time last year	56,676 12	1,650,639 17	1,707,316 09
Increase		831,125 02	843,997 06
Decrease	12,872 04		
Forwarded East from M'h Chunk by rail	49,829 13	1,944,384 06	1,994,213 19
Same time last year	44,301 18	1,365,212 12	1,409,604 10
Increase		579,171 14	584,609 09
Decrease	5,437 15		

RECAPITULATION.

Forwarded East from M'h Chunk by rail	49,829 13	1,944,384 06	1,994,213 19
To N. C. R. R., at Mount Carmel	341 06	931 17	1,273 03
Forwarded North from L. & B. Junction	5,666 04	184,244 06	189,910 10
To L. & S. R. R. at Packerton for rail	193 01	5,206 13	5,399 14
Delivered at M'h Chunk	16 11	818 12	835 03
Delivered on line of road above Mauch Chunk	10 01	7,676 03	7,686 04
Delivered above M. Chunk for use of L. V. R. R.	944 01	36,097 15	37,041 16
To L. & S. R. R., at P'n Hav., for railroad			
Do. for canal	8,717 06	161,890 16	170,608 02
At M. Chunk for canal	3,720 13	81,134 11	84,915 04
Total Anthracite	69,498 16	2,422,584 19	2,491,883 15
Bituminous Coal		9,380 00	9,380 00
Total all kinds	69,498 16	2,431,764 19	2,501,263 15

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending August 20, 1870—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1870. tons ct.	WEEK, 1869. tons ct.	YEAR 1870. tons cwt.	YEAR, 1869. tons cwt.
Wyoming Region	26079 18	27429 08	751181 11	458735 01
Upper Lehigh Region	3453 12	946 15	80210 00	77017 12
Mahanoy Region	87 00		974 08	1907 01
Hazleton Region	8306 12	5638 07	177052 17	111568 12
Beaver Meadow Region	3822 15	5891 16	849.6 08	65978 05
Mauch Chunk Region	7856 02	10624 03	41886 05	21750 12
Totals	50125 19	50830 15	1146241 10	392777 03
Increase			21.964 07	
Decrease	8304 16			
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	21252 13	20331 06	619035 10	474216 18
Forwarded East of Mch Chunk by Canal	2 882 09	37288 01	376176 08	418469 02
Delivered at and above Mauch Chunk	1753 08	811 08	26192 09	20216 14
Delivered to L. & B. R. R. at Plymouth Bridge	3937 08		129.37 03	14 93 06
L. V. R. R. at Sugar N.				5151 03
Totals	50125 19	58830 15	1146241 10	932777 03
Of the above there was transported on acc'nt of L. C. & N. Co.	8505 09	19676 11	59109 09	238516 01
W.-B. C. & I. Co.	14048 19	13645 15	340500 00	243318 00
Totals	22554 08	33322 06	399609 14	481834 01
Increase				
Decrease	10667 18		82164 07	

Harrisburgh and Dauphin Coal Trade.

The following is the amount of Bituminous Coal transported via the P. and R. R. for the week ending August 18, 1870:

	Tons.
For week	13,166 15
Previously this year	481,773 08
Total	494,940 04
Same week last year	14,267 16

Penn. and N. Y. Canal and Railroad Co.

REPORT of Coal Transported via the Pennsylvania and New York Canal and Railroad Company, for week ending August 20, 1870:

	WEEK.	PREVIOUSLY.	TOTAL.
Anthracite	5,676 09	184,715 18	190,391 07
Bituminous	5 551,00	151,585 00	157,136 00
Total, Ant. and Bit.	11,227 09	36,300 18	347,527 07

Shipments of Cumberland Coal

for the week ending Saturday, August 20, and for the year 1870:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M	.....	.....	.....
Borden	1.134 04	1,707 03	2,841 04
Consolidation	3 371 14	3,886 07	7,258 01
Spruce Hill	658 02	 11	658 02
Midlothian	747 12	809 11	1 557 03
H. and Baltimore	.....	225 03	225 08
do Va M	975 15	.....	975 15
V C & I Co	1,115 10	.....	1,115 10
G. C. C. and I	1 552 08	.....	1,552 08
Maryland	1,568 14	4.418 09	5,977 03
American	1,207 04	2,519 12	3,726 16
Atlantic	720 07	.....	720 07
Piedmont	1,054 00	.....	1,054 00
Swanton	1,056 00	.....	1,056 00
Barton	878 00	.....	878 00
Potomac	705 15	.....	705 15
Franklin	2,090 12	.....	2,090 12
Big Vein	2,743 11	.....	2,743 11
Total week	21 569 05	13 566 05	35 135 10
Previous	575,655 16	362,013 02	937,668 18
Total year	597,225 01	375,579 07	972,804 08

Statement of coal transported over the Cumberland and Pennsylvania Railroad during the week ending Saturday, Aug. 20, and during the year 1870, compared with the corresponding period of 1869:

WEEK.

YEAR.	C. & O. CANAL. Tons.	Cwt.	B. & O. R. R. Tons.	Cwt.	TOTAL. Tons.	Cwt.
1870	11 513 13		16,750 07		28,264 00	
1869	17,478 04		22,752 06		40,230 10	
Increase						
Decrease	5 964 11		6 001 19		11,966 10	

YEAR.

YEAR.	C. & O. CANAL.	B. & O. R. R.	TOTAL.
1870	321,042 09	523 291 03	844,333 12
1869	359,078 19	615,139 13	974 218 12
Increase			
Decrease	38,036 10	91,848 10	129,885 00

Statement of coal transported over the Eckhart Branch Railroad, during the week ending Saturday, Aug. 20, 1870, and during the year 1870, compared with the corresponding period of 1869:

WEEK.

YEAR.	C. & O. CANAL. Tons.	Cwt.	B. & O. R. R. Tons.	Cwt.	TOTAL. Tons.	Cwt.
1870	2,052 12		2,727 13		4,780 05	
1869	2,906 09		2,714 16		5,621 05	
Increase						
Decrease	853 17		12 17		841 00	

YEAR.

YEAR.	C. & O. CANAL.	B. & O. R. R.	TOTAL.
1870	59,120 07	64,472 07	123.592 14
1869	44,292 08	66,271 12	110,563 15
Increase	14,828 04		13,028 19
Decrease		1,799 05	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, August 25. R. A.	W. A.	AT PHILADELPHIA, August 24. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$5 00	5 00	4 50
Steamer	— —	5 00	— —	4 50
Broken	— —	5 25	— —	4 50 to — —
Egg	5 75 to 6 25	5 25	— —	4 75 to — —
Stove	— —to— —	5 75	— —	4 75 to — —
Chestnut	4 50 to 5 40	4 75	— —	4 25 to — —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	6 10	— —	— —	— —
Broken	5 85	— —	— —	— —
Egg	5 85	— —	— —	— —
Stove	6 10	— —	— —	— —
Chestnut	5 50	— —	— —	— —
Pea	— —	— —	— —	— —

SPECIAL COALS.*

Diamond Vein	R. A.	6 50	— —	— —
New England	"	— —	— —	— —
Locust Dale	W. A.	6 25	— —	— —
Money Brook, Leh	W. A.	5 25 to 6 00	— —	— —
Spring Mountain	"	5 25 to 6 00	— —	— —
Sugar Creek	"	5 25 to 6 00	— —	— —
Sugar Loaf	"	5 25 to 6 00	— —	— —
Old Comp'y's	"	5 25 to 6 00	— —	— —
Cross Creek	"	25 to 6 00	— —	— —
Enterprise	"	— —	— —	— —
Girardville	"	— —	— —	4 75
McMichael	"	— —	— —	4 75
Shamokin	"	5 50	5 25	— —
Lykens Valley	"	— —	5 25	— —
Broad Top	"	5 50	— —	— —
Hill & Harris	"	— —	4 75	— —
Henry Clay	"	— —	5 00	— —
Powelton	"	5 50	5 00	— —

[*Dealers in these coals may be found in our advertising columns.]

Prices for Coal at Mauch Chunk.

	F. L.	Bro.	Gra.	Eg.	Sto.	Cst.
Lehigh	$3 00	$3 75	$3 75	$3 75	$4 00	$3 25
Wilkesbarre	3 00	3 75	3 75	3 75	4 00	3 25

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein	f.o.b. at Phila.	$5 00
Lemon	" " "	4 75
Cumberland Vein Coal		5 00
Cumberland C. & I. Co.'s on board	N. Y.	7 00
Maryland Coal Co.	"	7 80
Consolidated Coal Co.'s	"	7 00

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Clses.
Scranton at E. Port						
Pittston at Newburgh						
Lackawana at Rondout	4 50	4 60	4 80	5 00	5 50	4 50
Wilk'b're at Hoboken	5 00	5 25	5 50	5 50	6 00	5 00
Old Co. Lehigh at Pt. Johnston	— —	— —	— —	— —	— —	— —
Lehigh at E. Port	5 75	5 50	5 50	5 50	5 75	5 00

For freights to different points, see "Freights."

Prices at Baltimore—August, 1870.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 30@5 50
Pittston and Plymouth, do.	5 00@5 25
Shamokin Red or White Ash, do.	5 50@6 00
Lykens Valley Red Ash, do	5 40@5 50
Zerba Valley	25 5@— —
By retail, all kinds per ton of 2240 lbs.	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@5 00
Fairmont and Clarksburg gas, f. o. b. at L. Point	5 35@5 53

Prices at Georget'n, D.C., & Alexandria, Va.

August, 1870.

George's Creek and Cumberland f. o. b. for shipping..$4 55

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— —@— —
Lykens Valley	— —@— —
Shamokin Red or White Ash	— —@— —
Trevorton and Zerba Valley	— —@— —

Prices of Gas Coals.

August, 1870.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 73 Pine st., N.Y.

	Duty, $1 25, gold. Coarse.	Slack.
Block House	$1 75	@— 75
Gowrie	1 75	@— 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@— 80
Lingan	1 75	@— 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@— 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Coarse.	Slack Currency.
Fairmount Gas Coal Co. of N. Y.	7 50	@— —
Despard Coal Co.	$7 50	@— —
Penn.	— —	@— —
Newburg Orrel Gas	— —	@— —
West Fairmount Gas Coal	8 00	@— —

AT PHILADELPHIA.

Powelton	$7 80

Prices of Foreign Coals.

August, 1870.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	10 00@12 00
" House "	13 50@15 50
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon	$2 00
Less drawback of 80 cents on all Coal shipped east of New Brunswick and south of Cape Henry.	

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 84
C. R. R., N. J., Easton to Elizabethport	1 27
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 46

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R. or L. & S. R. R. from M. C. to Easton	$ 84
C. R. R., of N. J., Easton to Pt. Johnson	1 34
Shipping expenses	25
Warfage	10
Total	$2 53

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 84
Morris & Essex R. R. Easton to Hoboken	1 34
Shipping expenses	25
Warfage	10
Total	$2 53

TO SOUTH AMBOY.

L. V. R. R.	84
B. & D. R. R. / Cam. & Am. R. R.	1 14
Shipping Expenses	25
Total	$2 23

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	84
C. RR. of N. J. Easton to Elizabethport	1 27
Shipping expenses	25
Wharfage	10
Total	$2 46

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 07
" Port Carbon	1 10
" Port Clinton	1 00

TO NEW YORK.

From Schuylkill Haven	$1 70

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$0 70
Freight and towage	1 07
Total	$1 77

TO NEW YORK.

Lehigh Canal	$ 40
Morris " / Freight / Towing	1 10
Total	$ 2,50

TO JERSEY CITY.

Lehigh Canal	$ 40
Morris " / Freight	2 00
	2 40
For re-shipment	2 20
Total	$4 60

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 40
Delaware Division Canal	50
Delaware and Raritan Canal	25
Freight	1.25
Towage	20
Total	$ 2,50

TO NEW BRUNSWICK.

Lehigh Canal	$ 40
Delaware Division Canal	50
Delaware and Raritan Canal	35
Freight	1.05
Total	$ 2,10

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

Freights.—AUGUST, 1870.

TO EASTERN PORTS.	From Philada.	From E. Port and Port Johnston.	From Newburgh	From Rondout
Amesbury	$2 70	$— —	$ 1 60	$ 60
Bangor	2 75	— —	1 60	
Bath	2 75	2 90	— —	
Boston	2 70	1 55	2 25	2 25
Bridgeport	2 60	1 00	1 10	1 20
Bristol	2 25	1 25	1 40	
Cambridgeport	2 70	2 30	— —	
Derby	2 60	— —	— —	
Dighton	2 30	— —	1 45	
East Cambridge	2 80	2 30	— —	
Fall River	2 30	1 25	1 40	
Hackensack	1 75	1 50	— —	
Hartford	2 75	1 35	— —	
Jersey City	1 75	50	— —	
Middletown	— —	1 25	— —	
Mystic	— —	1 25	1 30	
New Bedford	2 25	1 40	— —	
Newburyport	2 70	2 00	— —	
New Haven	1 70	1 00	1 10	1 20
New London	2 00	1 15	1 25	1 30
Newport	2 30	1 25	1 40	
New York	1 35 to	1 50	50	70
Norwalk		1 80	1 05	
Norwich	and tow	2 30	1 35	1 40
Pawtucket		2 30	1 50	1 60
Portland		2 70	1 75	
Portsmouth, N. H.		2 60	2 25	1 85
Providence		2 30	1 40	1 45
Rockport		2 10	— —	
Saco		2 75	2 10	
Sag Harbor		2 00	1 40	1 30
Salem		2 70	1 95	2 25
Stamford		2 00	1 00	1 00
Stonington		2 00	1 30	1 25
Taunton		2 30	2 00	
Warren			1 40	1 45
Washington		1 10	— —	
TO RIVER PORTS.				
Albany			80	60
Catskill			— —	50
Cockaskie			— —	50
Coeyman's			— —	75
Cold Spring			— —	35
Fishkill			— —	30
Haverstraw			50	60
Hudson			— —	50
New York			— —	70
Nyack			50	60
Poughkeepsie			— —	35
Rhinebeck			— —	30
Rondout			— —	— —
Saugerties			— —	40
Sing Sing			— —	75
Stuyvesant			— —	55
Tarrytown			80	75
Troy			90	75
West Point			— —	35
Yonkers			40	60

Towing Rates.

TO EASTERN PORTS.

	Per Ton.
To New Haven	$ 40
Bridgeport	40
Southport	40
Westport	40
Norwalk	40
Stamford	40
	Per Boat.
Greenwich	$70 00
Port Chester	80 00
Mamaroneck	70 00
Glen Cove	— —
New Rochelle	55 00
East Chester	60 00
West Chester	30 00
White Stone	30 00
College Point	25 00
West Farms	25 00
Flushing	30 00
Harlem and Mott Haven	20 00
Port Morris	20 00
Ninety-first street and Astoria	16 00

Boats beyond Port Chester, with less than 200 tons, $80 per Boat.

TO RIVER PORTS.

Boats of 150—250 Tons.	Per Ton.
To Manhattanville,	8 cents
Spuyten Duyvil,	8 "
Yonkers,	9 "
Hastings,	10 "
Piermont,	12 "
Dobbs' Ferry,	12 "
Nyack,	14 "
Tarrytown,	15 "
Sing Sing,	16 "
Croton Landing,	17 "
Haverstraw,	17 "
Verplanck's,	17 "
Peekskill,	18 "
West Point,	20 "
Cold Spring,	20 "
Newburgh,	18 "
Poughkeepsie,	22 "
Rondout,	23 "

Boats of 100 Tons	Per Boat.
To Manhattanville, and Return,	$11 00
Spuyten Duyvil, "	13 00
Yonkers, "	15 00
Sing Sing, "	20 00
Peekskill, "	25 00

Foreign and Provincial Freights.

August, 1870.

Foreign.	
Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool	12s.6d@14.ton

METALS.

NEW YORK, August 26, 1870.

IRON.—Duty: Bars, 1 to 1½ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, $ ₱ ton; Polished Sheet, 3 cents ₱ lb.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	33 50@35 50
Pig, American, No. 1	33 00@34 —
Pig, American, No. 2	30 —@31 —
Pig, American, Forge	29 —@30 —
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00

	Store Prices, Cash
Bar, Swedes, ord'y sizes, less 5% ₱ ct.	— —@110 00
Bar, Refined, " "	80 —@ 85 00
Bar, Common " "	75 00@ 80 00
Scroll, " "	97 50@130 —
Ovals and half-round, " "	100 —@125 —
Band, " "	95 —@ — —
Horse Shoe, " "	95 —@ — —
Rods, ⅜ to 3-16 inch, " "	95 —@120 —
Hoop, " "	105 —@150 —
Nail rod, less 5 ₱ ct.	— 7 @—7½
Sheet, Russia, as to Nos. (gold).	— 11½@—11¾
Sheet, Single, D. and T. Common.	— 5 @— 6
Sheet, Galv'd, Nos. 14 to 26 10 and 12c. Nos. 27, 28, and 29, 13¾ 14	
Rails, English (gold), ₱ ton	59 00 @60 00
Rails, American, at Works in Pa.	70 00 @71 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ore lb; over 11 cents, 2½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality),	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— — @— 18
American, Spring, do.	— 9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	@— 30
Copper Bolts	@— 30
Copper Braziers, 16oz. and over	@— 30
Copper Nails	35 @— 36
Copper, Old Sheathing, &c., clean	@— 17
Copper, Chili Pig	@— —
Copper, American Ingot	20⅞@— 21⅛
Yellow Metal, New Sheating	@— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	@— 22

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs.	$— — @— —
Spanish (gold)	6 32½@6 45
German, do.	6 37½@6 45
English, do.	6 37½@6 62½
Bar (net)	@8 00
Pipe and Sheet (net)	— — @8 00

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

	Gold ₱ lb.
Banca	37 @37½
Straits	36 @36¼
English	32¼@32½

PLATES. Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ₱ box	$8 75 @9 —	$10 75 @11 —
I. C. Coke	7 50 @8 —	9 25 @ 9 75
Coke Terne	6 — @6 25	7 25 @ 7 50
Charcoal Terne	7 75 @8 —	9 50 @ 9 75

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ₱ 100lb

	Gold.
Plates, Foreign ₱ 100 lbs.	$6 37½@ 6 62½
Plates, Domestic ₱ lb.	08½@- 11½

REMARKS:

IRON.—Scotch Pig is in limited request, and prices are not very firm. We have only to notice a sale of 100 tons Gartsherrie, in lots, ex ship, at $35 @35 50. American meets with very little inquiry, but prices are supported. We quote $32 50@34 for No. 1, and $30@31 for No. 2 extra; 100 tons No. 1 sold on private terms. In Rails we hear of considerable; sales 72 lbs. Double-headed English, at New Orleans, at $61, gold. The market here is very quiet, and prices are irregular. Refined Bar from store continues steady, but quiet at our quotations. Makers ask $85 from store, in Philadelphia, which is more than can be realized here for assortments from store.

LEAD.—There has been a little more inquiry for Foreign, and prices are steady and firm. We notice sales of 125 tons Spanish at $6 37½, and 50 do. soft, $6 40, gold. Bar, Pipe and Sheet are steady at 8c. each. The St. Louis *Republican* of the 16th inst. says:

"The Government has sold to manufacturers in this city 200 tons of English Pig Lead at $7.75 ₱ 100 lbs., the award upon the bid having been received yesterday. This fairly establishes in Missouri the advance in Lead to 7½c. ₱ lb for soft. The Shot Tower Company now quote Patent Shot, $2 35; Buckshot, $2 60 ₱ bag; Bar Lead, $8 50 ₱ 100 lb.

COPPER.—New Sheathing Copper and Yellow Metal are unchanged. The market for Ingot is quiet but firm; sales 200 lbs. Detroit and Lake, August delivery, at 21@21½c., and 100,000 lb. do. September, 21@21½c.

TIN.—Pig has a downward tendency. One hundred pigs Straits sold at 36c., gold, and 400 do., on private terms, and 5 tons English, to arrive, at 32½c., gold. Plates are very firm at previous quotations, with further sales of 2,000 boxes Charcoal Tin, at $8 75@9; and 500 do. Charcoal Terne, $7 75 @8, gold.

SPELTER.—The market for Foreign remains quiet, but prices are unchanged; 25 tons Silesian sold on private terms. Domestic is in fair request at steady prices, with sales of 25 tons Missouri Zinc Company at 6½c., gold.

STEEL.—There is a moderate demand for lots from store at old quotations.

ZINC.—Sheet is in moderate demand at 10@10½c, currency, for lots from store. Fifty casks Mosselman sold, to arrive, at 8½c., less 4 ₱ cent., gold. American Ox. Zinc, 6½@7c.; French do., 10@10½c.; Manganese, 4@4½c.

Mining Stocks.

NEW YORK, Aug. 25, 1870.

Colorado stocks have advanced considerably in price, almost without exception, since our last. California stocks are a shade firmer, but Nevada's continue without any change. The following is the Stock Exchange report:

	Bid.	Asked.
American Flag	8	15
Bates and Baxter	15	—
Benton Gold	5	—
Black Hawk Gold	—	40
Central Gold	22	23
Consolidated Gregory	75	85
Grass Valley	36	38
Gunnell Gold	15	—
La Crosse Gold	08	—
Liberty	01	03
Mariposa	5½	—
Mariposa pfd	8	9
N. Y. and Eldorado	20	50
Quartz Hill	20	25
Symond's Forks	—	75
Smith & Parmelee Gold	50	—
Quicksilver	4½	5¾
Quicksilver, pref	—	10
Wa kill	03	—
Walkill assented	05	—

Petroleum stocks are without any noteworthy change, being quoted as follows:

	Bid.	Asked.
Bennehoff	—	40
Bergen Coal and Oil	—	—
Buchanan Farm	—	—
Central	50	65
Home Petroleum	1 25	1 50
Northern Light	—	—
Pithole Creek	—	1 40
Phillips	15	25
Rathbone	—	40
Rynd Farm	25	35
Second National	—	75
United Petroleum Farms	15	17
United States	—	80

San Francisco Stock Market.

A Telegram from San Francisco, dated Aug. 23, quotes stocks as follows:

Savage	35	Gould & Curry	92
Yellow Jacket	33	Belcher	No sales.
Kentucky	35	Imperial	—
Chollar Potosi	44¾	Amador	No sales.

The Slate Trade.

NEW YORK, August 26, 1870.

BUSINESS continues dull, and the prices which we quote below are nominal, with a tendency downward. We reduce our quotations of Vermont Slates 50c. all through, except red. Pennsylvania Slates continue unchanged.

A correspondent of the Poultney, Vt., *Bulletin*, furnishes some interesting particulars relative to the operations of the Green Mountain Slate and Tile Company—a new institution, in which some of our New York citizens are interested. We condense the following: The quarry is located at Poultney, and was opened about three years since, by Messrs. W. R. & J. R WILLIAMS, quarrymen. In January, 1869, they sold out their interest to the present proprietors, who immediately formed a company under the name and title mentioned above.

The Company is incorporated under the general law of the State of New York, and the officers are GEORGE WEST, Esq., of Ballston, President; Dr. R. HAMILTON, of Sartoga Spa., Treasurer; and H. A. WILSON, also of the latter place, Secretary. The office of the Company is located at Saratoga Springs. J. R. WILLIAMS, of Poultney, is the resident agent and superintendent. The development of this quarry, thus far, has not disappointed the most sanguine expectations of the Company, but has been attended with the most flattering results. The color of the slate is an unfading green, and very uniform in shade. The stock, in texture, smoothness of cleavage and kindness under the tools of the quarrymen and roofers, has no superior. They readily yield to be formed into any desired shape, with far less than the ordinary waste. This Company has just completed a large job of slating for the LELANDS, of Saratoga Springs, having used over 250 squares in covering their new "Mammoth Hotel." The Company are now constructing a road from the quarry to the nearest point to the railroad, which when completed will place them within a quarter of a mile of the track.

Prices of Slate in New York.

[Corrected weekly.]

("square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square	$9 00@10 00
" green, 1st " "	9 00@10 00
" red, 1st " "	15 00@16 00
" variegated, "	8 0 @ 9 00
Pa. b'k and d'k blue, 1st qual., "	7 00@ 8 00

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending August 20, 1870.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Jones & Williams	210 squares.
Locke Slate Co	210 "
Hope " "	35 "
Lehigh Slate Co	210 "
Girard Slate Co	70 "
D. Williams & Co	175 "
J. Anthony	175 "
D. Thomas	70 "
Saylor & Morgan	175 "
Keystone Slate Co	35 "
Total	1295 "

SCHOOL SLATES.

Lehigh Slate Co	43 cases.
D. Williams	84 "
Locke Slate Co	140 "
Total	253 "

BLACK BOARDS.

Yerkes & Martin	11 cases.
Lehigh Slate Co	20 "
Total	14 "

MANTELS.

Lehigh Slate Co	24 cases.
Yerkes & Martin	26 "
Total	26 "

LEHIGH CANAL.

ROOFING SLATE.

Eagle Slate Co	150 squares.

LEHIGH AND SUSQUEHANNA R. R.

ROOFING SLATE.

Twin City Slate Co	70 squares.
Eagle Slate Co	— "
Humbach Slate Co	35 "
J. M. Coffin & Co	— "
Philadelphia Slate Co	— "
Hope	20 "
Total	280 "

SCHOOL SLATE.

A. W. Leach	20 cases.

[From our Special Correspondent.]

The Vermont Slate and Marble Interests.

WEST RUTLAND, Vt., Aug. 23, 1870.

The village of West Rutland is four miles from Rutland proper, upon the line of the Rutland and Saratoga Railroad. It is the centre of Vermont's marble interest. The qualities produced here are of the best description. There are, of course, various grades, from the best statuary down to the ordinary hard blocks used as building stone. In this village there are ten quarries—four of them are owned by Messrs. SHELDONS & SLASONT. They employ at the present time about 200 men. Part of these are in the quarries, and part in their marble sawing-mill. This mill is the largest in the world—80 by 180 feet. It has 22 gang saws and 2 whip saws. The power is furnished by a 200 horse-power double engine, built by H. C. BROWN & Co., of Fitchburgh, Mass, It is a fine machine, poppet-valves, with cut-off under control of the governor. The old boilers, five in number, are just being replaced by a new set not nearly as large, built by Messrs. SKINNER & ARNOLD, of Albany, N. Y. They have already reduced the consumption of coal three tons per 24 hours, a saving of 25 per cent. or more.

The next is the Rutland Marble Company. They employ at the present time about 225 men, though they have had 300 at times. They are working three quarries at the present. They do their own sawing. Their mill has twelve gangs of saws and a single or whip-saw, known here as a "Ripper."

Messrs. PARKER, GIBSON & DEWEY have now in the neighborhood of sixty men at work. They have one quarry and one mill; the latter has eight gangs of saws. The number of men at work at the present time is much less than formerly, owing to the small demand.

Messrs. SHERMAN, ADAMS & LANGDON have one quarry in operation. Their mill, however, is situated at Hydeville, eight or ten miles distant by railroad. At the mills they employ about twenty-five hands.

The quarries support a population of may be one or two thousand. There are probably one thousand men at work in and about them, although not steadily engaged, and so not included in the enumeration. One of the great drawbacks to the trade is the high charges for freight. A ton of marble cannot be carried from Rutland to New York as cheaply as from Italy to New York. The freight from Troy to New York is the same as from Italy. The only way in which there can be any competition is the fact that Italy does not produce the fine white marbles, except, of course, "statuary," as it is known in the trade. The product this year of these Vermont quarries is not likely to be as large by one-half as it was last year. It will not probably amount to over a million dollars.

Last month (July), there were 413 car-loads of marble shipped from this station, equal in all to 8,398,282 lbs.—4,000 tons and over. These figures are official, having been taken from the station agent's book. The freight charges on marble forwarded last year from this station amounted to $73,000.

The Ferry Between France and England.

THE boats will be no less than 450 feet long—the largest ships in the world except the "Great Eastern"—nearly 60 feet beam, and more than 85 feet across the paddle boxes. Two complete railway trains—one for passengers and one for goods—can be accommodated on board each ship by a most ingenious arrangement. The stem and stern will be made open, to admit the entrance and exit of trains, carriages and wagons. The passenger trains will run upon a platform occupying the whole length of the vessel on its main deck, and protected from the weather overhead by the upper deck. The goods train will descend an incline to a lower platform, just under the passenger train. Dining saloons, ladies' cabins, smoking-rooms, custom-house rooms, etc., will be situated on the main deck, either side of the platform on which the passenger train rests. By this most convenient arrangement passengers may either remain in the carriages or, as most of them would assuredly do, may alight and take their ease in the saloon during the sea passage, supping, breakfasting, dining, or otherwise refreshing the inner man before resuming their journey on French ground. The idea is that the entire voyage from coast to coast shall be made in about an hour, and the constructional and steaming qualities of the vessel are to be conducive to this end. As it is part of the bargain (in which Neptune is supposed to be concerned) that there is to be scarcely any pitching or rolling, nothing is likely to prevent the big ferry ship from making a rapid transit. The passengers would secure the self-same seats in the self-same carriages all the way from London to Paris. The luggage and the mails also would be undisturbed. It is in this saving of time, by avoiding the necessity of transshipping passengers' luggage and mails, that the shortening of the journey will be mostly effected. The rails on the quay, on the hydraulic hoist, and on the platform in the ship, will of course be on the same gauge, and will be properly connected by points, sidings, etc. At high-water the passenger platform in the ship will be about level with the quay; at the other states of the tide a descent of the hydraulic hoist will easily accommodate itself to the difference in level. Marine engines of first rate character, and all the best appliances of machinery are, of course, to be looked for. If done at all, the thing must be done well. Admiral OMANEY has so far indorsed this plan as to indicate what the size of the great steam ferry-ship might be, according to the depth of water which the harbors would accommodate, 400 feet long with a draw of 13 feet, 350 with one of ten feet, and 300 with one of 7 feet.—*Chambers' Journal.*

The New Mineral Land Law.

THE press of the mining counties is already anticipating considerable benefits from the operation of the new law for the sale of mineral lands. Under this law, the owner of a placer mine, who has expended upon it not less than $1,000 in work, will be entitled to a patent for it from the United States, on proving the facts of his undisputed possession and outlay, and on paying the small price required, with the fees of the land officers, which cannot be large where there is no contest. Fortunately, the law is so framed that merely speculative locations do not establish a claim to title. There must be actual labor to an amount indicating an intention of actual development. Then, while any sized claim heretofore honestly worked may be patented, a standard is set up for the future, as a further check upon speculative monopoly. To make the acquisition of title as convenient as possible to individual miners, it is provided that several parties may apply together. Having once secured title, they could divide the ground as they pleased. But a fair construction of the law will not permit the recognition of dummy locators, whose names are used by friends, under existing local rules, to secure a large claim to one or two persons. The location must be made in good faith, and be followed by occupation and improvement.

The mining journals in several of the principal districts state that, in numerous instances, owners of placer claims are already preparing to apply for title. This obtained, capitalists will be more willing to purchase, or to assist in working such claims. Heretofore, there has been no security for heavy investments in placer mining, except reliance upon shifting local regulations and steady maintenance of active possession.

The new law, as we have heretofore explained, facilitates the acquirement of title to agricultural lands in the mineral districts, and will lead to a settlement of the disputes often arising between the miner and farmer. The miner himself is more encouraged to become a farmer, and to cultivate the soil adjoining his diggings. The general and speedy effect of the law will be to enhance values, to diversify industry, and to fix population in the mining counties. It is probable that particular directions in regard to the bearing and enforcement of its provisions will soon be issued by Land Commissioner WILSON, who is in hearty and intelligent sympathy with its objects.

In the *Annales du Genie Civil*, Dr. REINSAH gives the following directions for rendering wood difficult of combustion and preserving it underground: "The wood, unplaned, is to be placed for twenty-four hours in a liquid compound of one part of concentrated silicate of potassa and three of pure water. After being removed, and dried for several days, the wood is again to be soaked in this liquid, and, after being again dried, painted over with a mixture of one part of cement and four parts of the above liquid. When the first coat of this paint is dry, the painting is to be repeated twice. This paint mixture should only be made up in small quantities, as it rapidly becomes dry and hard. Wood thus treated becomes uninflammable, and does not decay underground."

Inorganic Wear and Tear.

NATURE exhibits in her geological agencies the grandest of antagonisms. Her energies on the one hand are expending themselves in building up continents; on the other, antagonistic activities are leveling mountain masses, changing the contour of existing lands, and beating down—gnawing away, rather—island and continent. What fire has reared up water tears down, wears away. The erosion of land commences synchronously with its appearance. With its birth it begins to die; but from its slow death comes the teeming soil—the home of vegetation, the object of the agriculturist's care, the support of toiling millions. It is the old, oft-repeated story of chemical action manifesting itself in its ceaseless round of activity, as life and death, as growth and decay. Every grain of sand on the sea-shore is a witness to this antagonism, to this struggle of nature's activities; every pebble by the brook side can tell the tale of this strife. Let us trace the movements of one of the contestants in this unceasing battle and see how water operates in disintegrating and breaking down the mineral accumulations of the globe. A drop of water falling through the atmosphere dissolves therefrom some carbonic acid. Its amount is, at its maximum, less than one per cent. of the volume of the water, and yet this trivial proportion is of vast significance in the economy of plant existence. Touching the ground the drop of water becomes contaminated with a farther amount of the same weak acid, derived from the air of the soil—the product of decomposed organic matter—and its chemical activity at once begins. The first step in many instances of its action on minerals and on mineral aggregates, which we call rocks, appears to be the hydration of their acid or basic ingredients—that is, it unites itself chemically with some of the constituents of the mineral with the formation of new compounds. These new products being softer and, in general, more bulky, are in conditions favorable to the further changes induced by the active and wide-spreading affinities of the associated carbonic acid. Few of our mineral species but show this condition of hydration to a greater or less extent; even those of admitted igneous origin, when broken out of apparently unaltered rocks, most frequently if not always contain small amounts of water of combination.

There is in addition to this chemical action of unaided water the mechanical one of its solvent power, which exercises a most important influence in the disintegration of minerals and rocks. All silicious substances are thus perceptibly acted upon, the action, it is true, being apparently but slight when the material is in mass, but is increased enormously by extension of surface by pulverization. This subdivision also has a mechanical origin. It must be borne in mind that in its freezing, water expands about one-fifteenth of its volume, and this expansive force tears asunder the hardest rocks and stones, rapidly crumbling them into a more or less fine or coarse powder, thereby increasing vastly the surface upon which the water may exert its solvent power. We witness many of the effects of frequent freezings of water alternating with thawings in lofty altitudes, and in colder latitudes. The talus at the base of the vertical trap cliffs along the Hudson has been torn from its parent mass by such means and reaches to more than half the height of the cliffs themselves. It has been observed that a smooth, clear pebble of the very compact Jura limestone, such as abound in the rivers of South Bavaria, if moistened with water and exposed for one night to a sharp frost will have numerous minute grains and fragments torn off to such an extent that the water in thawing is muddy with the detached fragments.

Once started this pulverization makes "the meat it feeds upon." The attrition of pebble against pebble, of grain against grain, reduces the state of subdivision. Each mass of moving ice, each ice-born mountain torrent starts the work which the quieter meadow brook and gentler flowing river in a measure keeps up, and all the time the water is dissolving, here a particle of silicia and there one of lime—not exempting what are to us, in our laboratories, the most insoluble of compounds, all of which are thus brought into condition to enter into new forms of combination.

But the water is assisted in this mechanical action of solution by the mechanical relations of the carbonic acid with which it is always charged. This action is towards the basis of the silicious and other minerals making up the rocks, and results in the removal of such in the form of soluble carbonates or bi-carbonates. It is unequal in its action, being strongest on those combinations confaining much soda and lime, less active on those containing silicate of pot ash, and still less, and in fact scarcely noteworthy, on aluminous and magnesian silicates. This is the action by which granitic rocks containing soda, or lime, or soda-lime feld spars are so rapidly converted into more or less pure clayey masses, the alkaline or alkaline-earthy constituents of these minerals being carried off in solution in the water after having become carbonated by the presence of the associated carbonic acid. It is through this that all natural waters show variable amounts of dissolved salts, expressing a corresponding wear and tear in the mineral kingdom and furnishing the crude materials for building up other forms of combination, and for changing the character of whole rocky masses.

The feldspathic ingredients of a large series of rocks are, through agencies of this kind, disintegrated and the rocks themselves rapidly weathered. The magnitude of such processes of decomposition is shown in the calculation made by BISCHOFF, that a spring yielding in twenty-four hours about eleven and one-half cubic feet of water, and containing one and one-third pounds of carbonate of soda to each one thousand pounds of water, would express the yearly decomposition of more than eighteen thousand pounds of soda-feldspar. This would correspond to more than twenty-seven tons of granitic rock weathered in the same time, on the supposition that one-third of its mass was made up of this material. Increase this amount almost infinitely by the great number of springs, by the running waters generally, many of them much richer in soda compounds and expressing, consequently, a more rapid decomposition; consider the amounts of soda and of potash and of lime required for the use of vegetation the world over, and additional to that passing into new mineral compositions, and this wear and tear of inorganic matter through chemical changes alone must be enormous.

There are on the one side minerals which wear away through such causes even more rapidly than do the feldspars, and on the other, some few in which the chemical changes are by no means so noteworthy. Almost every limestone cave, with its stalactitic columns and beautiful gypseous deposits, show how rapidly carbonated water dissolves limestone and, mayhap, through intercharge of acid ingredients, produce new compounds. Again the fragments of mica, not uncommon in clayey deposits, bear testimony to the fact that this mineral but slowly changes, contrary to what one would suppose from the foliated structure of the substance, presenting such a surface to be chemically acted upon. HAUY has calculated that a lamina of mica might be one nine-hundred-thousandth of a line in thickness—about half the thickness assigned by REAUMUR to the gilding upon lace—consequently a cubic inch of this mineral would have, according to BISCHOFF, a surface of one hundred and fifty thousand square feet, and yet the water which penetrates the finest lamina and spreads over all this surface leaves on it no trace of alteration.

Water therefore by a mechanical action, or by a chemical action assisted by carbonic acid, or by both means combined, breaks down and crumbles up most of the mineral matters of the globe. The products of such disintegration and decomposition, either when sedentary or in place, or when transported by moving waters, give rise to soils, or swept into the ocean, or deposited in some lake or estuary, form the coarse or fine fragmental deposits of the geologist. From the earliest appearance of dry land on the globe these deposits have been in process of formation and are always the remains of pre-existing land masses. The miles of sedimentary or stratified rocks which the geologist has studied and arranged—the leaves of the stony book of nature—are of such origin. They are the products of the wear and tear of inorganic matter and are themselves subject to the same changes. Throughout them all there seems to be this sequence in their deposition: First, the coarse fragments, followed by the finer particles, and succeeded in turn by the products of chemical action proper, the limestones, shales, etc. The coarse conglomerates usher in a new period. They are broken, rolled pebbles of pre-existing rocks—the product of the mechanical wear—cemented together by chemical action. The sandstones, getting finer and finer in grain, and the slates show the advance of the new period, whilst the chemical precipitates bring it to a close and make it ready for its resurgance as dry land to be acted upon in the same manner and to furnish materials for the same sequence of results in its turn.

How vast must have been this wear and tear when this series of deposits repeats itself through fully twenty-five miles of strata. How the running waters, and the frosts, and the lashing waves, and the falling rain, and the moving ice must have gnawed away at the earliest appearing of the fire-born rocks. "How vast must have been the space thus left vacant by each abstraction of matter! how far exceeding in dimensions all the valleys, however numerous, and all the hollows, however vast, which we can prove to have been cleared out by aqueous erosion! The evidences of the work of denundation are defective, because it is the nature of every destroying cause to obliterate the signs of its own agency; but the amount of reproduction in the form of sedimentary strata must always afford a true measure of the denundations which the earth's surface has undergone."

Whence came the materials for the formation of these sedimentary rocks—for these twenty-five miles of strata? We look back into the dim vista of geologic time, to the youth of the earth, when the great Laurentian system—upwards of thirty thousand feet thick in Canada—was deposited and find that its remains embrace nearly the whole of the globe, that it passes beneath all the more recent strata, is the foundation upon which they are built, and that it extends, probably with greatly reduced thickness, under the beds of the present oceans. It is the common opinion that it accumulated while the primeval sea was well nigh universal And yet "it is perfectly plain," says Professor WINCHELL in his "Sketches of Creation," "that these vast beds of sediment must have had an origin in pre-existing rocks lying within reach of the denuding agencies of the times. How enormous a bulk was ground to powder to furnish materials for these Laurentian strata may be imagined when the reader is reminded that the mean elevation of North America is but about twelve hundred feet above the level of the sea; and if the entire continent were ground to powder down to the sea-level and distributed over an area of the sea's bottom equal only in extent to North America, it would afford a bed of strata not one-twentieth the thickness of the Laurentian system over the same region." What an enormous and long-continued wear and tear must have taken place for such an accumulation of sediment. We are not able to indicate the points of origin of those strata, but we must be convinced of the gigantic scale of denuding operations in the earliest periods of the globe.

Given the formation of these fundamental strata of the Laurentian system, whatever may have been their points of origin, and we have the materials for the formation of all the subsequent sedimentary deposits from their decay. How great the lapse of time, taken by the causes we have indicated, to wear away these strata and to redeposit them under new guises elsewhere! We watch the slow process of the disintegration of rocks under the most favorable combination of circumstances, chemical and mechanical, and turn back through the lapse of geological periods with the vain attempt to guage time with this puny measure. We measure the sediment carried down to old ocean's bed by the giant rivers of the globe, and the process seems so slow a one that the mind almost reels in its attempt to grasp the extent of time requisite to build up a thickness of one mile of strata. We stand beside the great Black cañon of the Colorado—a gorge cut for more than a mile depth and for three hundred miles extent, through cretaceous, carboniferous, and sub-carboniferous, paleozoic formations a thousand feet deep down into the fundamental granite, and wonder at the æons that have elapsed since this furrow was commenced to be turned. It must have been in the later periods of the earth's history, and gigantic though it is, is but a scratch to the wear and tear, the ploughings down of the Laurentian period.

We measure and calculate the rate of recession of the great Niagara Falls to attain data upon which to base our estimate of the antiquity of this wearing away of the earliest continental masses, but we forget that though the forces then operative were doubtless the same in kind, they were, at least so far as the chemical activities are concerned, much more energetic. Many new affinities were then to be satisfied and new partnerships to be entered upon. We simply stand upon the fragments of other continents—upon the remains of inorganic wear and tear—know how the breaking up and ploughing down of the poet's "everlasting hills" are effected, realize that the solid rock is no symbol of endurance, but rather one of mutation, but can we say how long this gnawing has been going on? We see the ravages of the "tooth of time," realize something of their extent, have only begun to learn how the work is done, but form no conception of the time lapsing since it first commenced to gnaw on the first of the fire-born rocks of a slowly cooling globe.—*Exchange and Review.*

The Aachen Polytechnic.

WE have recently dwelt at considerable length upon the system of technical education pursued at Berlin, and the academies which are opened for the use of the numerous students who avail themselves of the magnificent opportunities for professional instruction offered by the Prussian Government. The Polytechnic School of Aachen has the same privileges as the similar establishment of Hanover, and the Bau Akademie, and Geverbe-Akademie of Berlin, and offers like advantages to those institutions. The organization of the Aachen school consists of a preparatory class, and of three higher departments, one for architects and civil engineers, one for mechanical engineers, and one for chemists and metallurgists. The lectures of the preparatory school comprise courses in natural science, mathematics, and such branches of education as it is supposed the pupils in the highest departments are already versed in. The full course of lectures in the architectural and civil engineering departments extends over four years, for the first three of which they are the same for both classes of students, but in the fourth the instruction is separately given for each branch. At the expiration of the term students are free to enter into the competitive examinations for Government appointments. The mechanical engineering course also extends over four years, but it is not essential that the student should go through the whole series, the lectures being so arranged that the student may at the expiration of half the time quit the academy to complete his education in practical apprenticeship. In the third department, that allotted to chemical and metallurgical study, the length of time is only three years. The course of lectures embraces the higher mathematics, descriptive and practical geometry, mechanics, architectural and mechanical technology, architecture, railway and road engineering, the design and construction of machinery, mineralogy, geognosy, physics, chemistry, telegraphy, metallurgy, drawing, (free hand, mechanical and architectural) foreign languages.

The director of the Aachen school is Professor VON KAVEN, formerly of the Hanover Polytechnic, and among the lecturers are many of high standing, selected not only from the best German universities, but also from departments connected with the practical working of railways, mines and technical establishments. Before being admitted to the college the students have to prove, either by certificate from a Government school or by examination, that they possess the elements of a general scientific education, but the Akademie is open to such foreigners, or to Germans without this preliminary test, who wish only to avail themselves of a special course, or part of a course, without devoting themselves to the acquirement of a final certificate, or who do not intend to pass the Government examination. Students are also left at liberty to select for themselves such a course of lectures as they consider will be best suited to complete their education in the branch to which they address themselves, but general plans of the courses for architects, civil and mechanical engineers, chemists, and metallurgists, are laid down, which the pupils are recommended to follow. The fees for the lectures, which have to be paid half-yearly in advance, depend upon the number of lectures the student wishes to attend each week, but the maximum sum does not exceed three guineas for articled pupils, and £4 10s. for other students for the course per half year. For practical experiments in the chemical and physical laboratories £2 5s. in addition is charged for the same period. The term commences in October, (this year on the 10th) and concludes on the 31st of July, but two weeks are allowed at Christmas and three weeks at Easter, for vacations. Connected with the college are completely furnished chemical and physical laboratories, an excellent mineralogical and palæontological collection, the facilities for illustrating the lectures in the different branches of science, and a well-selected library. The chemical laboratory is placed in an independent building, and affords room for sixty pupils at a time, while the college itself, a noble building, possesses accommodations for five hundred students.—*Engineering.*

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor.

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Copper Ore from Texas.

A FEW weeks since we gave in the JOURNAL an account of the explorations of Professor ROESSLER in Texas. The trip was made in the interest of the General U. S. Land Office, and was necessarily somewhat superficial, but it will be remembered that at the same time Prof. R. used his influence and procured the passage by the Texas Legislature, of a bill for a geological survey of the State. During the past week we have received from Prof. ROESSLER a handsome specimen of the copper ore, to which allusion was made in his letter. It is a pure mass of Glance copper, weighing about two pounds and a half. It presents the structure of a coarse wood, of which there seems to be but little doubt that it is pseudomorphic. According to analysis, by Professor ROESSLER, it contains 55.44 per cent. of copper, a little malachite, carbonaceous matter, and oxide of iron. It was found at the three forks of the Little Wichita River, in Archer County, Texas. Large quantities of this valuable mineral are said to lie exposed on the surface of the ground, and in all probability a careful examination of the ground, and a few small pits would suffice to disclose the deposits from which these surface specimens originally came. A very encouraging feature of these copper deposits is that they occur in the Permian formation, which yields copper so profusely in the neighborhood of Mansfeld in Prussia. The ore found in that vicinity is a slate impregnated with copper pyrites containing a small per centage of silver, which they are enabled to separate by the excellent process of Ziervogel. The mines have been worked for hundreds of years without any diminution in a yield which constitutes a large part of the entire copper production of Prussia. The copper-slate (kupferschiefer) is so poor—containing only about two per cent. of copper—that it would not pay to work in this country, but the specimens from Texas are vastly richer, and if the extent of the deposits is anything like that of the Mansfeld district, we may expect shortly to hear of a copper production in Texas, which will cast in the shade anything ever accomplished on Lake Superior. Archer county is still so infested by Indians that we can hardly hope to hear of the immediate opening of these mines, but as an abundance of good coal is found in the adjoining county, through which a railroad is already projected, we shall probably hear something further from them before long. American enterprise will certainly investigate the subject, and if the present favorable indications are confirmed, means of security against Indians will soon be provided.

Is Coal Contraband of War?

THIS question, we see from our exchanges, is attracting considerable attention from English coal owners. We know from experience what a singular thing British neutrality is; and it is rather amusing to watch from this distance the endeavors of many of the writers on the subject to prove that coal may be supplied to the French fleet without any violation of what is there known as the Foreign Enlistment Act. In the House of Commons Mr. GLADSTONE stated that the *direct* exportation of coal to either France or Prussia was illegal. Of course *indirect* shipment would meet with the approval of the government, just as the *indirect* building, arming and manning of privateers for the South was permitted during our war. The favorite English authority on the subject seems to be WHEATON, who says that a State cannot prohibit the exportation of articles contraband of war "without a manifest departure from the principle of neutrality." In other words, English neutrality would appear to consist in fighting on both sides; or, perhaps, if the truth were known, on the side that pays the best.

Meeting of the American Association.

EDITORIAL CORRESPONDENCE.

[The substance of these letters was also published in the N. Y. *Evening Post*, from day to day, during the meeting.]

I.

TROY, August 18-23, 1870.

IT is sufficiently evident that the comfort and the entertainment of the members have been amply provided for. This is, after all, the main thing. The social enjoyment attendant upon one of these meetings is even more important and beneficial than the contributions to science elicited. The latter can be made in other ways as well—through lectures, periodicals and correspondence. It is the meeting, face to face, of men whose cloistered labors might otherwise keep them forever asunder, the hearty recognition of co-workers in the fields of science, and the personal good fellowship born of actual acquaintance, that constitute the most characteristic benefit of such meetings, the benefit, at least, which nothing else could confer.

Nevertheless, the scientific work of the association cannot fairly be overlooked, or set down as insignificant. I think it may be pronounced, without doubt, far more fruitful than the National Academy of Sciences, its younger and more exalted companion. It is not right to regard these two bodies as rivals. If Congress, which created the Academy, would only show a wise liberality in supporting it, it might be like that of Paris or Berlin, a select and distinguished body of veterans in science, the goal of young ambition and the reward of mature achievement. Just now, however, the Academy labors under the vulgar difficulty of poverty, arising from its small numbers. Its proceedings cannot be published in full; and its members have little incentive to present the fruits of their labors to meagre audiences, and subsequent pigeon-holes. Perhaps this is one reason why so many papers, presented to the Academy, are afterwards brought before the Association, where a larger audience of experts ensures them a sympathetic reception, and a heavier purse provides for their publication to the scientific world.

It is noticeable, however, that the Association is, by no means, a mere receptable for the second-hand contributions of academicians. The programmes of the present meeting show a large number of papers from the representatives of young science; and it is remarkable how small a proportion of the participants in the papers and debates have gray hairs. Many of the veterans are absent. First and foremost, we miss AGASSIZ, with his piquant and sometimes petulant obstinacy, and his good nature shining through it. The old man has trained a school of vigorous and independent young naturalists, who do not accept the opinions of their master. Last year, at Salem, COPE, of Philadelphia, reverentially but thoroughly floored him in debate. VERRILL, MORSE and others, have keenly criticised a good deal of his work; and, in short, so long as AGASSIZ opposes the Darwinian philosophy, these young Darwinians will make it warm for him. It is now said that ALEXANDER AGASSIZ has come out on that side, and that the Professor himself is only seeking for a loophole through which he may crawl to abandon the untenable fortress which he has so long and stoutly defended. Variously explained, modified and limited, DARWIN'S philosophy will doubtless be, but overthrown it will not be.

The pleasant face of Dr. GOULD, now in South America, as astronomer of the Argentine republic, is also sadly missed; but science and society will both be repaid for his absence by the pleasure and profit to be received in a few years from his return.

DRS. TORREY and GRAY, *arcades ambo*, are both here, and so young in spirit and activity yet that one forgets how many years they have stood in the front ranks of American science. President BARNARD, of Columbia, is another of the young old men, around whom the wise young men, who desire to be yet wiser, are wise enough to gather. Professor HENRY, of the Smithsonian, is absent in Europe. RUTHERFORD, of New York, is missing thus far. DAWSON, of Montreal, one of our best beloved *savans*, is not here. Professor HALL, of Albany; Dr. MORRIS and Mr. TYSON, of Baltimore, who are all present, would perhaps be angry if I ranked them as old; but old and young are relative terms, and certain it is that the crowd at this Troy meeting is composed of comparative youngsters.

HITCHCOCK, the geologist, of New Hampshire; MORSE, a leader among our young zoölogists; COPE and LEIDIE, unsurpassed in their palæontological specialties; ORTON, the Vassar Professor of Natural History; TENNEY, who occupies the same department at William's; MAYER, the physicist of Lehigh University; PERKINS, Professor of Chemistry at Union; ROOD, the brilliant Professor of Physics at Columbia; BARKER, from Yale, standard-bearer of young chemistry; the brothers CHANDLER, of New York; NEWCOMB, the astronomer, from Washington; yes, even STERRY HUNT and NEWBERRY, whom everybody knows, are all to be classed among the coming, rather than the going men. They and their compeers form a body of which American science may well be proud to-day, and will be prouder to-morrow. Some of them look like mere boys; and the way they enjoy themselves outside of the section-room shows that they are boys at heart, though, for that matter, nobody unbends with greater jollity than do the gray-heads. But in the work of these men there is proof of conscientious accuracy and mature knowledge of scientific method. HILGARD, of the Coast Survey is here, genial and wide-awake on all scientific topics. He is one of the unusually accomplished men whose readiness and accuracy is matter for perpetual marvel. One or two lively and interesting scenes have already occurred, such as the debate between NEWBERRY and HUNT, on the origin of the Canada petroleum, the discussion of WINCHELL'S paper on the magnetic wells of Michigan, and a very sprightly row this afternoon over MORSE'S radical paper on the classification of brachiopods. But nothing has been said or done to mar the absolute good nature which here rules supreme. There is nothing stronger, so far, than a sharp antithesis now and then. The learned gentleman on either side invariably flatters the learned gentleman who has just sat down, and conveys his opinion, if need be, that the learned gentleman has made a great blunder, in the most delicate and complimentary manner.

II.

One of the events of Thursday was the introduction to the Association of Dr. HERMANN VOGEL, a distinguished photographer of Berlin, who visits this country as a guest of the American Photographical Association. The address of Dr. HUNT, expressing the pleasure of this body at meeting one so celebrated in photography and photo-chemistry, was responded to by Dr. VOGEL in a brief speech, in praise of America and American science, with the hope that America and Germany may be hereafter still more closely united in this respect. The quaint but forcible language of the doctor made his remarks quite piquant, and brought hearty applause from the audience.

A rather lively scene occurred in Section A, over Professor WINCHELL'S paper on the magnetic wells of Michigan. It seems that there are a number of artesian wells in that State, the water of which magnetise soft iron and steel, when these are immersed in it. Professor WINCHELL has made a large number of experiments which confirm this statement; but he does not profess to be a magnetician, and it was evident that some of the eminent physicists present put little faith in the method and result of his experiments. One or two attacked the adventurous geologist who intruded upon the realm of magnetism; but HILGARD, who occupied the chair, skillfully turned the talk, and the matter dropped.

The debate between NEWBERRY and HUNT, in which also Professor HALL took part, on the origin of the oil of the Canada fields, was one of considerable interest. HUNT believes the petroleum of that region to be from the bituminous limestones, and NEWBERRY refers it to the slates. Underneath this distinction there is a question as to its animal or vegetable origin.

The afternoon was consumed in Section B, over brachiopods and their classification. MORSE, who read some able and radical papers on the subject, COPE, DALL, HYATT and SHALER, took part in the debate. Next morning the same section was entertained by a masterly paper from COPE, on the reptiles of the triassic period, the most striking point of which was the refutation of some sweeping statements of HUXLEY, as to the permanence and isolation of those types, and the jurassic origin of the modern reptillian forms. Professor COPE'S readiness at the blackboard materially assists his demonstrations, and his rapid, fluent and clear method of speaking (without notes) is indeed marvellous.

Professor MEEHAN read to-day a brief and entertaining communication on "Objections to DARWIN'S Theory of the Fertilization of Flowers by Insects." The title of this paper was almost a trap, for it was an account of two instances, the salvias and the petunias, in which the author had once fancied he had found exceptions of a striking character to DARWIN'S law, but which he does not now believe to be exceptions at all. In the case of the petunias, which are particularly well adapted for insect fertilization, he had watched for days without observing that any insects entered them; certainly the bees did not. But the mystery was solved by the discovery that they are visited at night by countless numbers of moths, and that by these insects, and not by the bees, the cross-fertilization is effected. The moral is, that young naturalists should bear in mind that more insects can obtain their food by night than by day, and not too hastily conclude that any plant is wholly unvisited by them. It was also brought out that bees frequently obtain honey by slitting the honey-tube, and not by penetrating the flower; but this appears to be a peculiar habit of individuals rather than of species. Dr. GRAY, in the subsequent discussion, remarked that those flowers which are cross-fertilized by insects possess one or more of three properties; honey, odor, and bright color. Where these are wanting, insect-fertilization is not to be expected. Hence the urea, or nettle group, is not to be considered an exception or an objection to the Darwinian theory on this subject, though this group is in form otherwise well adapted to be entered by insects, and to scatter pollen upon them. Dr. GRAY declared that he had frequently attempted to catch DARWIN tripping in this particular, and had referred to him many instances which he himself at the time considered opposed to the theory; but in every case he had been forced to withdraw his objection.

An able paper on meteorology was read to-day by Professor J. H. COFFIN, of Lafayette College, whose investigations of the laws of winds undoubtedly place him at the head of that branch of meteorology in this country.

III.

The address of the retiring President, FOSTER, of Chicago, was delivered last night. It was a comprehensive (and perhaps just a little ponderous) review of the progress and condition of the question of pre-historic man. Afterwards the Association and numerous invited guests were magnificently received and entertained by the Mayor of Troy, Mr. GILBERT, (the famous car manufacturer) at his splendid city residence. Music and beauty, wit, science and ice-cream, harmoniously mingled to form a charming whole.

Saturday afternoon's excursion to Albany was especially an enjoyable affair, though attended with some hardships to the weaker members of the party. The weather was quite warm, and the steam-tug was well crowded. There was a long walk to the line of the horse-cars, and a hard climb up the hill to the Dudley Observatory.

Here the exhausted inner man was refreshed with tea and

coffee, and the party, between one and two hundred strong, spent an hour in investigating the delicate arrangements of the transit instruments, the great equatorial, and the ingenious electric registering apparatus of Professor HOUGH. There is a self-recording barometer, which retains a complete continuous record of all variations in pressure, in a curve like that upon an indicator-card, and another which takes readings from the barometer at regular intervals. A similar contrivance registers automatically every hour the direction and force of the wind.

Then there is the famous Swedish calculating machine, or differential engine (an illustrated description of which is contained in the August number of the *Manufacturer and Builder*), by means of which tables of logarithms, powers, zenith distances, etc., may be computed with absolute accuracy to fifteen places, and printed at once, without chance of typographical error, upon paper or stereotype metal. This machine must not be confounded with the THOMAS arithmometer, which is in use at the Treasury Department at Washington—a machine for multiplications, additions and subtractions. Each is admirable in its line, and both could be, I think, a little improved in the details of mechanical construction, so as to secure longer wear. The THOMAS at Washington is badly worn already, and has a tendency to drop a figure now and then; but the Swedish machine, at Dudley Observatory, is yet, apparently, as good as new. It is not worked hard here.

From the observatory and its genial director, the procession returned to town and over-ran the State Museum of Natural History. The principal feature is the skeleton of the Mastodon discovered at Cohoes some years ago. The missing bones have been replaced with imitations so close as to deceive even the scientific observer.

Throughout the afternoon select parties visited the private museum of Professor HALL, a mile or two from the centre of the town, a magnificent collection in palæontology. The colossal foundations of the new State Capitol were also inspected, with many shrewd predictions as to the probable cost of the job.

The evening was occupied by a pleasant reception at the State Library, in the spacious hall of which an excellent repast was spread. The association was welcomed to the hospitalities of the Albany Institute by a speech from Professor HALL, the best he was ever known to make. Dr. STERRY HUNT responded, alluding to the fact that the American Association had its cradle in Albany, in the association of geologists and naturalists which preceded it. Dr. HUNT'S connection with the latter began twenty-five years ago.

A magnificent aurora illuminated the homeward trip on the river, and the party arrived at Troy by eleven o'clock, all in good condition and spirits, except Mrs. O'LEARY, wife of a Professor from Cork, who is attending the association. This lady accidentally broke a rib by falling from the plank to the side of the steamer.

Saturday's proceedings included many matters of scientific and popular interest. Foremost among these must be ranked the exceedingly clear and forcible paper of Lieutenant DUTTON on the chemistry of the Bessemer process. This was read in general session, before a crowded house, and received with repeated applause. The gist of it was that the chemical reactions of the Bessemer or pneumatic process are the same as those of the puddling process, the difference being in mechanical means employed, and the extraordinary temperature at which, in the Bessemer process, the reactions are produced. The author said there was much error in the community as to the product of the Bessemer process. It was thought to be an inferior steel, whereas it is not truly steel at all, but an excellent *cast-wrought-iron*, better than that produced by puddling, because the fluidity of the charge throughout the whole operation permits a higher degree of purity and homogeneity. Lieutenant DUTTON described phosphorus as the pest of the Bessemer manufacturer, and said that the only pig used for this purpose east of the Alleghanies is European imported, clear iron. He hoped that chemists would discover some method of purifying American pigs or ores from phosphorus, or that ores of sufficient purity would be hereafter discovered. This paper was characterized by great clearness and common sense. It will be published in full. At its close the session adjourned into sections, and the regular order was resumed.

In section A, there was a number of astronomical papers. In section B, Professor HITCHCOCK, State geologist of New Hampshire, unfolded some new views as to the structure of the White Mountains.

Dr. HUNT gave an interesting, though brief, account of the iron sand ores of Canada and New England. These ores, which occur in great abundance on the Moisie river in Canada, are there made the objects of a successful metallurgical industry. Similar deposits on the coast of Long Island Sound were worked in good old colony times, and the manufacture of steel was begun, but checked by a decree of the home government, forbidding an industry calculated to injure the manufacturers of England. After the lapse of nearly a century, the iron sands of Long Island are now about to be worked again.

Two zoological papers, both of importance, were presented from Messrs. PACKARD and PUTNAM, members of that group of young scientists who are making Salem famous among naturalists.

Professor ORTON, of Vassar College, read a paper of absorbing interest, on the evidences of a glacial period at the equator. This conclusive paper gives the final stroke to the hasty theory of AGASSIZ, who inferred rather than proved the existence of a glacier in the Amazon valley. Professor ORTON now exhibits in great quantity marine and brackish-water fossils from that valley, showing its strata to be not a glacial, but an estuary deposit. The specimens were examined with much attention by the palæontologists present, and but one opinion was expressed concerning them.

At a general session, held in the evening of Saturday, two papers were presented, the first of which was on the theory of MRS. EMMA WILLARD, ascribing the circulation of the blood to the heat of respiration as the motive power; and the other, by J. H. HUNTINGTON, on the occupation of Moosilauke mountain, New Hampshire, during last winter. Mr. HUNTINGTON spent several months on the top of this mountain, for the purpose of making meteorological observations. The paper was marred somewhat by attempts at fine writing, and still more by a monotonous and ineffective delivery. Still, we obtained from it a vivid impression of the intense cold, the ice-mist, and the terrific force of the wind, as well as the splendor of the cloud and summit views from this elevated look-out. A few fine stereoptic pictures of some of these features appropriately closed the papers and exercises of the evening. Mr. HUNTINGTON intends to pass next winter in a similar manner as a scientific martyr-hermit, on the top of Mount Washington, from which point his weather reports can be telegraphed daily to all parts of the world, if the world cares enough about the weather up there to ask for the information. For a rapid review of the remainder of the session, you must wait still another week. I have secured copies of a number of the papers of interest to the readers of the ENGINEERING AND MINING JOURNAL, and will publish them in full. R.

War and Copper.

SHOULD the present war in Europe prove to be as fierce and prolonged as indications warrant us in supposing will be the case, the copper-mining interests throughout the world must temporarily be affected by it. Every reader knows what resulted from the late rebellion in the United States. Copper advanced from sixteen cents to sixty cents per pound, within the first year of the war. The demand was much greater than the supply, and every copper mine in the world was strained to its utmost capacity to meet the great wants resultant from the war in America. Terrible and prolonged as was that contest, it cannot be considered a circumstance to what is promised in the contest just opening in Europe. Here it was simply between the people of one nation, containing a less population than either of the present combatants. Where the army here of both sides was composed of only about five hundred thousand soldiers, either France or Prussia marshal more. While here it was to perpetuate and bind together a nation, there it is to wipe out and dismember them. Here it was the mistaken idea of one section that their liberty was curtailed, and a determination to extend and increase it, while the other section of the land as fully determined that not a star should be erased from the national banner, but that it should continue to be a United States, which influenced the hearts of the people in the respective portions of the country. There it is tyranny and ambition on the one side, pitted against the nation's rights and liberties on the other. Here naval engagements were a rarity, there France makes her boasts that she excels.

Thus we perceive the reasons why our metal should be in greater demand than during the war of the rebellion. The utensils of war for the European combat must be two or threefold greater than they were in the American civil conflict. The same causes which advanced copper from sixteen to sixty cents per pound six or eight years ago, will produce like effects now. What is required to make copper-mining successful and profitable is, that the consumption should be as great, if not greater, than the production. If such happy results could be attained, dull times in copper-mining districts would be unknown. But unfortunately this order has been reversed for the past few years; the production has far exceeded the demand, and copper has been a drug upon the market. It is owing to this simple fact that so many mining companies have ceased operations, and that such general depression exists throughout the Lake Superior districts. War is a fearful evil, but like all other evils is attended by many goods. The chief of these are that particular industries and particular peoples are called into requisition to supply the wants of those thus engaged. The armies of Europe demand breadstuffs, they demand clothing, they demand necessaries to prepare the munitions of war. Those nations professedly out of the direct resulting evils are the ones who are called upon to supply these demands. Our own nation is peculiarly and favorably situated to meet these various wants. Our wheat fields are limitless, our manufactories numerous, and our mines are inexhaustible. Why then should not the copper ranges of Lake Superior again resound with the busy hum of active life? Why should not our rich mines bring forth their thousands of tons of mineral, be ready to meet the demands which must and will come?

We believe the time cannot be far distant when the people scattered through this Upper Peninsula will be rewarded for their patience and faith.—*Ontonagon (L. S.) Miner.*

The Value of Ore Shipments.

THE San Francisco *Bulletin*, July 30, says: Since May last, nearly 700 tons per month of silver, copper and gold ores have arrived in San Francisco, and this amount is increasing every month. Last year only about 500 tons per month were received. Next year there is every reason to believe that the amount will reach 1,500 to 2,000 tons per month. This ore, we are assured, is worth, on an average, say $200 per ton, even in the crude state, or a present total of about $140,000 per month. What it will amount to five years hence no one can certainly say, but it is well known we have yet hardly cut through the rind of this rich pecuniary fruit. The most of the ore received here comes from Nevada, but now it is definitely decided that we will get all the ore of Utah as well. In May last, twenty tons of ore from the Cottonwood mines were shipped to this city, and a like amount to the smelting works of Newark, N. J. These shipments were made as experiments. The result from the Atlantic shipment was a direct loss; that from the shipment here a handsome gain. In fact, a deduction from the profit made here had to be made to cover the loss on the shipment made to New Jersey. Sixty to ninety days elapse before returns from ore are received from Newark, while returns are made from this city in ten to twenty days from the departure of the ores in the cars from Utah. The cost of shipping a ten-ton carload of ore to this city is $200, while it is $290 to $325 if sent to Newark. The saving on freight coming this way is therefore $90 to $115 per carload. Of the 700 tons now received by us monthly, about 200 tons are reduced at Mayor Selby's smelting works here. This is very creditable to us, considering that we are yet but beginning. The remaining 500 tons are sampled and paid for here by Messrs. HOWLAND & Co., and are shipped to Swansea. The cost of shipment thence per sailing vessel is only $10 to $15 per ton. If a sample assay here shows that the ore contains $100 in silver to the ton, the owner receives $56 for the silver; if in addition it contains $75 in gold, he is paid $38 to $40 per ton; and if it likewise contains 20 per cent. of copper, he receives $50 per ton. The ore contains a great variety of metals, of which the smelting works on this coast can save only the silver, the gold, and the lead; the copper is lost. The English smelters have a great advantage over us in the article of copper. They can save all this metal. To enable us to do likewise, an expenditure of millions would be necessary for the erection of vast buildings and machinery, of which, in perfection, there exists but one establishment even in Wales. Then, the cost of coal and labor are greatly against us. In Wales coal is worth only about $2.50 per ton; here it costs $12 to $18. Labor there is worth but 75 cents to $1.50 per day; here it is worth $2.50 to $4 per day. Of course the time will come when we will reduce our own ores, and when the largest smelting works in the world will be here, but many years will elapse before that takes place. And in the meantime, the business of sending ore here for shipment abroad is a most profitable one both to the miners, the railroad company, our teamsters, sailing vessels, and to the general business of the coast. The fact that we will in future receive all the ores from Utah, is most gratifying. Since July 1st, 110 tons have been received from that territory, and heavy shipments are now on the way thence to this market. Previous to the building of the Pacific Railroad, none of all this ore could be shipped. The expense of sending it here was then prohibitory, and it is only within a few months that the business has become a profitable and extensive one. What it will amount to when branch railroads are built north and south from the main Pacific line, when the Southern Pacific road is built, and when the California and Oregon road is completed, allowing of shipments from the now unworked mines of the western slope of the Sierra Nevada, in Northern California, the wisest and most sanguine of us cannot pretend to guess. Already, however, it has been abundantly demonstrated that President Grant's boast—that the country west of the Rocky Mountains contained the treasure box of the world—was not a figure of fancy, but a glittering fact. Our "back" country may not be all grain-prairies, like that around Chicago, but its products are no less profitable, and are much more literally golden. With the expansive grain, vine and fruit lands of California, and with the inexhaustible mines of our own State, Nevada, Utah, Arizona and Idaho, we have the elements of a material prosperity, which the world can hardly surpass, and few regions can equal.

The Steel Trade of the Future.

IN a subsequent article we hope to point out the influence which the introduction of railways in Sweden may have upon the supply of a suitable raw material for the Bessemer process, a question which deeply concerns the general public in this country, but more especially our ironmasters and railway engineers. It is only fair to say that after several years' trial and controversy, Bessemer steel has attested its superiority for lines with heavy traffic, and for massive parts of railway plant. This being the case, it becomes an important question how to obtain a sufficient supply of Bessemer material, or, what is the same thing, how to obtain large quantities of a suitable raw material for use in the Bessemer process. England may be congratulated upon possessing in Cumberland and Lancashire mines of hematite which chiefly supply the country with the raw material for Bessemer work. Yet these mines have only yielded sufficient to allow the railway world to use steel to a very limited extent, while the general public demand remains unsatisfied. Naturally enough, attention has been seriously aroused to the value of new discoveries of suitable ore, and it was with satisfaction that we learned that at the last meeting of the Iron and Steel Institute in London, a committee was appointed for the purpose of endeavoring to discover new localities for such ores in this country. These attempts may not, however, be attended with success just at the time when the ore is most needed, and it therefore behooves us to extend our inquiries to neighboring countries. In this respect Sweden stands pre-eminent. The country, indeed, possesses ten times more ore than it has sufficient fuel to smelt. Spain, too, offers large quantities of iron ore of good quality, but unfortunately for herself she lacks the needful fuel wherewith to smelt it. In both these countries attempts have been made to export their ores to England, and at present with more success in Spain than in Sweden. Spanish iron ores are now largely imported in the South Wales coal district at the low price of 17s. per ton, which leaves a reasonable profit on both sides. The quality of this ore may not, however, so well adapt it to the manufacture of iron for Bessemer steel, the mineral being a brown iron ore derived originally from spathic ore, or carbonate of iron. Unfortunately the exportation of ores from Sweden to the Newcastle coal district has not hitherto been crowned with equal success, chiefly, and, perhaps solely, in consequence of the expense of transport from the mines, which are situated in the

heart of Sweden, say, at the average distance of 100 miles from the coast. The Swedish iron ores have therefore not been imported under 27s. per ton, and hence have been employed only for fettling. It will accordingly be seen that the attention given in our last number to light railways in Sweden is merited not only on its own account, but also by its important bearing on the iron and steel industry of this country.

As an illustration of the effects of our limited supply of Bessemer steel, we may refer to our own controversy with the *Engineer* twelve months ago as to whether the price of Bessemer steel would decrease or increase on the expiration of BESSEMER's patent. A few months back rails were sold as low as £9 15s. per ton, but since the patent has expired the price has gradually increased to £11 1s. or £12 per ton. We must admit that the price of iron has at the same time risen by about £1 per ton; but notwithstanding this, we see that there has been an increase in the price of steel consequent upon increased demand. We now believe that by a cheap means of transport from the extensive inland iron mines of Sweden to the coast, ore could be brought to our northeastern counties, and sold there for something like the same price as Spanish ores are sold in South Wales. For this purpose a railway is projected from Fahlun to Krasseka on the east coast of Sweden, touching the principal mines.

Until we may be successful in finding a larger supply of suitable ores in our own country, we believe that this project will be the readiest means of meeting the ever-growing requirements caused by the development of our steel industry. At the same time it will be of great benefit to Sweden, for without some channel of export, large quantities of her iron ores must lie useless and unwrought. Indeed, the limited supply of charcoal and the increased cost of production forbid the extension, and in many places even the continuance of smelting operations, so that the iron manufacture in Sweden has for some time past been gradually on the wane.—*Engineering.*

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106,540.—METHOD OF PUTTING FACE-DRESS ON MILLSTONES.—Joel S. Braley, John A. Schmitt, Utica, Mo.

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106,542.—COMBINATION OF SHAFTS AND POLES.—John G. Burchfield, and Seth W. Brock, Niantic, Ill., assignors to Seth W. Brock.

106,543.—LET-OFF MECHANISM FOR LOOMS.—Micajah C. Burleigh, Somersworth, N. H.

106,544.—PAINT-BRUSH.—William B. Burtnett, New York, N. Y.

106,545.—FERRULE FOR PAINT-BRUSHES.—William B. Burtnett, New York, N. Y.

106,546.—SEEDING-MACHINE.—Alphonso Button, Dunkirk, N.Y.

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106,548.—WHEEL PLOW.—Henry C. Carr, Bordentown, N. J.

106,549.—HITCH-HOOK.—George W. Chandler, Mason, N. H., assignor to himself and Calvin Searle, same place.

106,550.—TILE MACHINE.—Joseph Christen, New Orleans, La.

106,551.—CHUCK FOR HOLDING PIPES AND TUBES WHILE BEING SCREW-THREADED.—William T. Cole, New York, N. Y.

106,552.—DISH-STAND.—William F. Collier, Worcester, Mass.

106,553, antedated August 15, 1870.—ROASTING FURNACES FOR ORES.—John Collom, Empire City, Colorado Territory.

106,554.—HORSE HAY-RAKE.—James M. Colson, Morrill, Me.

106,555.—AUTOMATIC BUGGY-BRAKE.—Leander T. Conant, New Lisbon, Ohio.

106,556.—PLOW.—William G. Coombs, New Gloucester, Me.

106,557.—BOTTLE-STOPPER.—James Thompson Cree, Worcester, Mass.

106,558.—VENTILATING-WINDOW FOR RAILROAD-CARS.—Samuel Darling, Providence, R. I.

106,559.—PLOW.—Robert Dickie and Hugh Kirkwood Johnston, Bunker Hill, Ill.

106,560.—WEIGHING-SCALES.—George W. Dickinson, Charleston, Ill.

106,561.—MACHINE FOR MANUFACTURING WATCH CASES.—Thomas Bradford Dill, Boston, Mass.

106,562.—GRASS-SEED SEPARATOR FOR MANGERS.—David B. Dixon, Unionville, Mo.

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106,567.—SPINDLE-BOLSTER.—William F. Draper, Hopedale, Mass.

106,568.—HAND CORN-PLANTER.—Hugh Dyer, Fort Scott, Kansas.

106,569, antedated August 12, 1870.—MANUFACTURE OF INFLAMMABLE GASES FOR FUEL, &c.—William Elmer, New York, N. Y.

106,570.—TRUSS.—Thomas M. Fell, Glastonbury, Conn.

106,571.—HARNESS-OPERATING MECHANISM FOR LOOMS.—Albert R. Field, Central Falls, R. I.

106,572.—COFFEE POT.—William Funk and George Walter Port, Warrensburg, Mo.

106,573.—MEDICAL COMPOUND.—Lewis L. Gebhart, Providence, Ind.

106,574.—VAPOR-BURNER.—Ernest Gillert, St. Louis, Mo.

106,575.—CHURN-DASHER.—William H. H. Gorham and Burrett H. Williams, Greenwich, Ohio.

106,576.—WASHING MACHINE.—Allen Gregg, Springborough, Ohio, assignor to himself and Perry Gregg, same place.

106,577.—TRACTION-ENGINE.—Moses P. Hall, Hinsdale, N. Y.

106,578.—HEAD-BLOCK FOR SAW-MILLS.—Jacob W. Handshy, Tanesville, Ohio.

106,579.—WHEEL-CULTIVATOR.—Edwin D. Hatch, Oconomowoc, Wis.

106,580.—GUARD FOR ROOFS.—Samuel R. Hathorn, Worcester, Mass.

106,581.—ROTARY PUMP.—George W. Heald and Lorenzo D. Sisco, Baldwinsville, N. Y.

106,582.—INK OR WRITING-FLUID.—Chas. Hebel, Louisville, Ky.

106,583.—POTATO-DIGGER.—Leonard Henderson, Manson, N. C.

106,584, antedated August 11, 1870.—DRESSING AND TANNING SKINS.—Hermon A. Hibbard, Augusta, Mich.

106,585.—COATING METAL ARTICLES WITH INDIA RUBBIA.—Constantine Bingher, New Brunswick, N. J.

106,586.—SHOW-CASE.—John A. Holmes, Shopiere, Wis.

106,587.—AUTOMIZING-TUBE.—Thos. J. Holmes, Malden, Mass.

106,588.—LIQUID-MEASURE AND FUNNEL.—Joseph Huff, Ironton, Mo.

106,589.—MACHINE FOR REPAIRING BOILER-FLUES.—Joseph Hughes, Bloomington, Ill.

106,590.—FURNITURE-FASTENING.—Leonard A. Johnson, Candor, N. Y.

106,591.—LAST.—Nathaniel Jones, Syracuse, N. Y.

106,592.—SCREW-CUTTING MACHINE.—Edward Kaylor, Pittsburg, Pa.

106,593.—EARTH-CLOSET.—Christian Kieffer and Joseph R. D. Seeds, Wilmington, Del.

106,594.—GRAIN-DRILL.—Seth L. King and William Ogden, Owego.

106,595.—STAY FOR CARRIAGE.—Geo. C. Larkin, Portland, Me.

106,596.—PEN-HOLDER.—Robert B. Lawrence, Wheeling, West Va.

106,597.—SIEVE.—Robert J. Mann, Dallas City, Ill.

106,598.—LOW-WATER AND HIGH PRESSURE ALARM.—Gideon B. Massey, New York, N. Y., assignor to Massey Low Water Detector Company, New York City.

106,599.—CHURN.—Riley T. McCormack, Greencastle Junction, Ind.

106,600.—MOTIVE POWER FOR DRIVING STREET-CARS.—Patrick E. McDonnell, Lyons, Ill.

106,601.—COTTON-PICKER.—Daniel M. McRae, Webberville, Texas.

106,602.—SEEDING-MACHINE.—Daniel E. McSherry, Dayton, Ohio.

106,603.—MACHINE FOR BENDING VOLUTE SPRINGS.—Reuben Miller, Pittsburg, Pa.

106,604.—HORSE HAY-RAKE.—Joseph Mills, Milan, Ind.

106,605.—FRUIT-BASKET.—Richard Mitchell, Smyrna, Del.

106,606.—APPARATUS FOR THE MANUFACTURE OF NITRO-GLYCERINE.—George M. Mowbray, North Adams, Mass.

106,607.—APPARATUS FOR THE MANUFACTURE OF NITRO-GLYCERINE, NITRO-BENZOLE, &c.—George M. Mowbray, North Adams, Mass.

106,608.—CABIN-TABLE.—Henry J. Nichols, Searsport, Me.

106,609.—BASE-BURNING STOVE.—Benjamin Nott, Albany, N. Y.

106,610.—AUTOMATIC PASSENGER-REGISTER FOR VEHICLES.—Chas. Ottinger, Pittsburg, Pa.

106,611.—HAY-LOADER.—Gilbert G. Park, Xenia, Nebraska.

106,612.—PIANO.—Samuel W. Parker, Somerville, Mass.

106,613.—GIN FOR LINTING COTTON.—George W. Payne, Memphis, Tenn.

106,614.—LUBRICATOR FOR LOOSE-WHEELS.—Sylvanus E. Peart, McKeesport, Pa.

106,615.—RAILWAY CAR-SEAT.—Joseph Ives Pease, Stockbridge, Mass.

106,616.—PRODUCTION OF COLORS FOR DYES, INKS, &C., FROM ANILINE.—Robert Pinkney, London, England.

106,617.—MATERIAL FOR PASTE FOR BOOK-BINDERS AND OTHERS.—Isaac L. Plumer, Chelsea, assignor to J. S. Chase, Harwich, Mass.

106,618.—WAGON AND BUGGY-BRACE.—Nicholas Ramseyer, Farmersville, Ill.

106,619.—BOAT-DETACHING APPARATUS.—Nathaniel M. Ray, Surrey, Me.

106,620.—PADDLE-WHEEL.—James Rees, Pittsburg, Pa.

106,621.—SPINDLE-BOLSTER.—Isaac P. Richards, Whitinsville, assignor to George Draper & Son, Hopedale, Mass.

106,622.—GRAIN-THRASHER, &C.—Henry Ries, Norwalk, Ohio.

106,623.—WASH-BOILER.—Henry R. Robbins, Baltimore, Md.

106,624.—PROCESS OF FORMING SMOOTH TOPS ON GLASS JARS.—Frederick Rohrbacher and Ferdinand Hormann, Philadelphia, Pa., assignors to Salmon B. Rowley, same place.

106,625, antedated August 12, 1870.—PRESERVING WOOD.—Alexander J. Sheldon, Buffalo, N. Y.

106,626.—MANUFACTURE OF FERTILIZERS.—Thomas Sim, Baltimore, Md., assignor to himself and Jesse L. Hutchinson, same place.

106,627.—MACHINE FOR DECORTICATING AND DRYING GRAIN.—Evan Skelly, Plaquemine, La.

106,628.—REED ORGAN PIPE.—Charles W. Small, Worcester, Mass.

106,629.—VAPOR-CHANDELIER.—Charles E. Smith and Henry J. Rice, Columbus, Ohio.

106,630.—VAPOR-BURNING STREET LAMPS.—Charles E. Smith and Henry J. Rice, Columbus, Ohio.

106,631.—SEED-PLANTER.—Levi Smith, Chester Centre, Mass.

106,632.—PRESERVING MEAT.—Lewis H. Spear, Peekskill, N. Y.

106,633.—FOLDING CHAIR.—Alexander W. Stewart, Boston, Mass.

106,634.—WINDOW-FRAME.—Adam W. Stine, Crestline, Ohio.

106,635.—RAILWAY-CAR AXLE.—Frederick Sturneyk, St. Paul, Minn.

106,636.—STACK FOR PUDDLING, BOILING, AND OTHER FURNACES.—William Swindell, Allegheny City, Pa.

106,637.—CURTAIN-FIXTURE.—Albert E. Tripp, Springfield, Ohio.

106,638.—HAY AND COTTON-PRESS.—Grey Utley, Charlotte, N. C.

106,639.—LIFTING-JACK.—Alonzo M. Waters, Cuyahoga Falls, assignor to himself and Henry E. Mariner, Akron, Ohio.

106,640.—FENCE.—Isaiah M. West, Wilmington, Ohio.

106,641, antedated August 12, 1870.—LOGOTYPE.—William H. Wilkinson, Southwick, Mass.

106,642.—HOISTING-MACHINE.—William C. Williamson, Philadelphia, Pa., assignor to Williamson brothers, same place.

106,643.—COMBINATION OF OCHERS FOR PAINT.—David S. Wood, Tiskilwa, Ill.

106,644.—COMBINED SCRUBBING-BRUSH, &c.—Eugene Kincaid Wood, De Witt, assignor to Newbury J. Eaton, Montana, Iowa.

106,645.—ADJUSTABLE FRUIT-LADDER.—Samuel Wright, Hillsborough, Miss.

106,646, antedated August 19, 1870.—TABLE.—George E. Young, Providence, R. I., assignor to himself, Charles A. Young, and Solomon W. Young.

106,647.—METHOD OF PREVENTING DECAY IN THE TIMBERS OF BRIDGES, BUILDINGS, &c.—Augustus Allen, Cass county, Mich.

106,648.—STEAM COUPLING FOR RAILROAD CARS.—Samuel A. Appold, Baltimore, Md.

106,649.—MANUFACTURE OF SHEARS.—William B. Barnard and Andrew J. Barnard, Waterville, Conn.

106,650.—STOVE-LEG.—Daniel L. Bates, Dayton, Ohio.

106,651.—WOODEN PAVEMENT.—George A. Beidler, Philadelphia, Pa.

106,652.—JACKET FOR HEATING PIPES.—Michael Ber, New York, N. Y.

106,653.—DITCHING-MACHINE.—Ulric Blickensderfer, Springfield, Pa.

106,654.—BREAD-TOASTER.—Alanson Brown, Rochester, N. Y.

106,955.—SAW-MILL DOG.—John S. Brown, Seabrook, N. H.

106,656.—GRAIN FORK.—Wm. W. Bryan, Schaghticoke, N. Y.

106,657.—HEEL-BURNISHER.—Moses Burnham, 2d, Wenham, Mass.

106,658.—APPARATUS FOR GAUGING OR REGULATING THE FLOW OF WATER OR OTHER FLUIDS.—Edme Augustin Chameroy, Paris, France.

106,659.—EXTENSION STEP-LADDER.—Hiram D. Chance, Llewellyn, Pa.

106,660.—BALING PRESS.—Moses D. Check, Memphis, Tenn.

106,661.—PIANO.—Charles Frederick Chew, George Street, Chalk Farm road, England.

106,662.—STEAM-GENERATOR.—Jonathan M. Clark, New York, N. Y.

106,663.—FRUIT-BOX.—Charles Colby and Henry Charles Ward, Boston Harbor, Mich.

106,664.—MUCILAGE-HOLDER.—Charles Csozat Converse, Brooklyn, N. Y.

106,665.—HAND-STAMP.—William F. Corne, New York, N. Y.

106,666.—BED-BOTTOM.—Adon W. Cramer, Honesdale, Pa.

106,667.—BRONZING-MACHINE.—Samuel Crump, Brooklyn, N. Y.

106,668, antedated August 11, 1870.—NUT-LOCK.—David Cumming, Jr., Brooklyn, N. Y.

106,669.—SLIDE-VALVE FOR STEAM ENGINE.—Francis Curtis, Newburyport, Mass.

106,670.—PORTABLE GATE-FENCE.—John W. Curtis, Bath, N. Y.

106,671.—MACHINE FOR CUTTING HOOPS.—William H. Davis, Lexington, Ind., assignor to himself and Joseph Harlan same place.

106,672.—STOP-MOTION FOR BRAIDING-MACHINES.—Edmond W. Dean, Norwich, Conn.

106,673, antedated August 11, 1870.—PUMP-POD CONNECTION FOR DEEP WELLS.—Henry De Zavalla, New York, N. Y.

106,674, antedated August 13, 1870.—REVOLVING ROAD-SCRAPER.—Edward M. Doty, Joel L. Little, and Peter A. Schmidler, Springfield, Ohio, assignors to Edward M. Doty, same place.

106,675.—SPINNING-MACHINE.—Wm. Duffner, Petersburg, Ind.

106,676.—MACHINE FOR VARNISHING AND DRESSING LOOM-HARNESS.—Edward J. Lewiston, Me.

106,677.—HARROW.—George M. Ellis, Huntertown, Ind.

106,678.—HUB FOR CARRIAGE-WHEELS.—John M. Emmerich, New Haven, Conn.

106,679.—CARPET-DUSTER.—Thomas Ferry, Wilmington, Del.

106,680.—HAIR-BRUSH.—Samuel M. Firey, Clear Spring, Md.

106,681, patented in England, September 21, 1868.—UMBRELLA.—Samuel Fox, Stockbridge Works, Deepear, near Sheffield, England.

106,682.—BALLOT-BOX.—Gilbert Adolphe Frébault, Paris, France.

106,683.—STEAM-PUMP.—Alex. Friedmann, Vienna, Austria.

106,684.—COMBINED MOP HEAD AND WRINGER.—Wm. Gage, Buffalo, N. Y.

106,685.—WOOD-MOLDING MACHINE.—Alonzo S. Gear, New Haven, Conn.

106,686.—APPARATUS FOR COOLING BEER.—William Gee, New York, N. Y.

106,687.—THILL-COUPLING.—Willis S. Geer, Marshall, Mich.

106,688.—COOKING-STOVE.—John M. Goodfellow, Troy, N. Y.

106,689.—VAPOR-BURNER.—Benjamin D. Greene, Sturgis, Mich.

106,690.—CONSTRUCTION OF DITCHES.—Tobias K. Grube, Napoleon, Ohio.

106,691.—TIME-LOCK.—Lewis A. Haines, Wakefield, Md.

106,692.—PARLOR ORGAN.—Emmons Hamlin, Winchester, Mass, assignor to Mason & Hamlin Organ Company.

106,693.—CORN-PLOW.—Henry Harrier, Indianapolis, Ind.

106,694.—MACHINE FOR CUTTING BLIND-SLATS.—John W. Helder, Shannon, Ill., assignor to himself and Luther Trescott, same place.

106,695.—CHURN.—Franklin Marion Hindman and Nicholas Hiatt, Sidney, Iowa.

106,696.—BLOTTING-PAD.—Geo. C. Himmann, Boston, assignor to Levi L. Tower, Somerville, Mass.

106,697, antedated August 12, 1870.—FLOUR-BOLT.—James H. Jones, Yellow Springs, Iowa.

106,698.—BALE-TIE.—William A. Jordan, New Orleans, La., assignor to Edward P. Jones.

106,699, patented in England, January 5, 1864.—MANUFACTURE OF GAS FOR ILLUMINATION, &c.—Joshua Kidd, New York, N. Y.

106,700.—MACHINE FOR TREATING RAMIE AND OTHER TEXTILE PLANT.—Emile Lefranc and Joseph Nagoua, New Orleans, La.

106,701.—ADDING-MACHINE.—Frank T. Leilich, Frederick, Md., assignor to himself and Michael Leilich, same place.

106,702.—POTATO-PLOW.—Augustus Leonard, Newell's Run, Ohio.

106,703.—BALING-PRESS.—Conrad Locher, Oroville, Cal.

106,704.—BUCKET FOR PADDLE-WHEELS.—Alfred C. Loud, San Francisco, Cal., assignor to himself and W. J. Miller, same place.

106,705.—PRUNING-SHEARS.—Enoch J. Marsters, Shaw's Flat, Cal.

106,706.—FRUIT-CORER.—Enoch J. Marsters, Shaw's Flat, Cal.

106,707.—STRAW-CUTTER.—Albert P. Massey, Cleveland, Ohio.

106,708.—HOT-AIR FURNACE.—John McCoy, Burlington, N. J., assignor to himself and Carbon Stove Company.

106,709.—DRAIN-TUBE.—James McMillan, Perinton, N. Y.

106,710.—MANUFACTURE OR PAPER-PULP FROM WOOD.—Harrison B. Meech, Fort Edward, N. Y.

106,711.—REDUCING AND BLEACHING PAPER-STOCK.—Harrison B. Meech, Fort Edward, N. Y.

106,712.—LUBRICATOR.—James Meehan, Covington, Ky.

106,713.—FORM OF INGOTS FOR CORRUGATED METAL BEAMS.—Richard Montgomery, New York, N. Y.

106,714.—FIRE CRACKER HOLDER.—Charles Most, Bergen City, New Jersey.

106,715.—WATER-POWER WHEEL.—John Nipp, Jr., Raleigh, Ind.

106,716.—HAND-STAMP.—Marcus P. Norton Troy, N. Y., assignor to Ellen M. Ingalls, same place.

106,717.—TREATING BITUMINOUS SUBSTANCES FOR PAVEMENTS, &c.—James O'Friel, Brooklyn, N. Y.

106,718.—SOLAR-TIME INSTRUMENT.—François Martin Paunetrat, Paris, France.

106,719.—FRUIT-BASKET.—Sanford D. Payne, Kasota, Minn.

106,720.—MACHINE FOR BENDING WIRE SCREW-EYES.—Noah C. Perry, Chester, Conn.

106,721.—MOLE-DITCHING MACHINE.—Alfred Peterson, Stockwell, Ind.

106,722.—ICE-MACHINE.—Charles Plagge, New York, N. Y., assignor to himself and Theodore Glazier, same place.

106,723.—CAN-OPENER.—Alfred C. Platt, Sandusky, Ohio.

106,724.—MACHINE FOR VARNISHING AND LABELING FRUIT-CANS AND OTHER CYLINDRICAL PACKAGES.—Alfred C. Platt, Sandusky, Ohio.

106,725.—SKATE.—Alfred C. Platt, Sandusky, Ohio.

106,726.—BED-BOTTOM.—George Richardson, Milwaukee, Wis.

106,727.—PUMPING-ENGINE.—Louis C. Rodier, Springfield, Mass.

106,728.—CULTIVATOR.—John Root, Hartland, N. Y.

106,729, antedated August 17, 1870.—CIRCULAR-SAW MILL.—Titus H. Russel, Northfield, Vt.

106,730.—BINDING ATTACHMENT FOR SEWING MACHINES.—Joseph W. Sawyer, Boston, assignor to F. Draper & Co., Cambridge, Mass.

106,731.—FIFTH WHEEL FOR CARRIAGES.—Henry Sayler, Saint Paris, Ohio.

106,732.—BREECHING ATTACHMENT FOR HORSES.—William F. Schatz, Columbus, Ohio.

106,733.—CULTIVATOR.—John Root, Hartland, N. Y.

106,734.—METALLIC SEAL.—Alexander B. Small, New Orleans, La.

106,735.—POCKET SUN DIAL.—Dwight L. Smith, Waterbury, Conn.

106,736.—VAPOR-BURNER.—Willard H. Smith, New York, N. Y.

106,737.—MEANS FOR ADJUSTING CAR-WHEELS TO DIFFERENT GAUGES.—William B. Snow, New York, N. Y.

106,738.—SUSPENSION RING.—Daniel M. Somers, Brooklyn, N. Y., assignor to Levi L. Tower, Somerville, Mass.

106,739.—RAILWAY CAR-SEAT.—W. Horace Soper, Baltimore, Maryland.
106,740.—STOCK OR BLANK FOR BRACELETS.—Isaac B. Staples, Attleborough, Mass.
106,741.—GAUGE FOR CUTTING BIAS PIECES OF CLOTH.—Samuel T. Taylor, N. Y.
106,742.—HARROW.—Cornelius Thayer and Leman L. Thomas, Otego, N. Y.
106,743.—COMBINED GANG PLOW AND CULTIVATOR.—Sterling C. Thornton, Macomb, Texas.
106,744.—HEAD-BLOCK OF SAW-MILLS.—William B. Trunick, Louisville, Ky., assignor to Nathaniel B. Connel, same place.
106,745.—CULINARY APPARATUS.—John Van, Cincinnati, Ohio.
106,746.—HOT-AIR FURNACE.—John Van, Cincinnati, Ohio.
106,747.—CALK FOR BOOT AND SHOE.—Jno. L. Wager and Abram L. Scudder, Sanford, New York, N. Y.
106,748.—SKATE.—Edward P. Waggoner, Syracuse, N. Y.
106,749.—WALLS FOR BUILDINGS.—James Weathers, Greensburg, Ind. assignor to himself and V. P. Harris, same place.
106,750.—COAL STOVE.—Jonathan R. Weber, Morris, Ill.
106,751.—SEED-PLANTER AND FERTILIZER.—Dexter P. Webster, Boston, Mass.
106,752.—SHUTTLE FOR SEWING-MACHINE.—William W. Wells, Webster, Iowa.
106,753.—VAPOR-BURNER.—Joseph White, Philadelphia, Pa., assignor to himself and J. B Wickersham, same place.
106,754.—BIT STOCK.—Charles P. Whitman, Claremont, Mass.
106,755.—SHAFT COUPLING.—Seth H. Whitmore, Decatur, Ill., assignor to Caleb C. Burroughs, and James Milliken, same place.
106,756.—SHAFT COUPLING.—Seth H. Whitmore, Decatur, Ill., assignor to Caleb C. Burrsughs and James Milliken, same place,
106,757.—WEATHER-STRIP.—Henry W. Wicker, Norwich, Conn.
106,758.—COMBINED FORK AND BAND-CUTTER.—Milton Wenger, Upper Leacock, Post Office, Pa.
106,759.—DEVICE FOR REMOVING LIME FROM HARD WATER.—Kasson Frazer, Syracuse, N. Y.

REISSUES.

4,103.—SPRING MATTRESS.—Edwin L. Bushnell, Poughkeepsie, N. Y.—Patent No. 95,984, dated October 19, 1869.
4,104.—BUGGY-TOP.—A. Morrel Cory, New Providence, N. J.—Patent No. 97,479, dated December 7, 1869; antedated November 20, 1869.
4,105.—CHERRY STONER.—George Geer, T. G. Hadley, and Wm. Hamilton, Galesburg, Ill., assignees of George Geer.—Patent No. 63,715, dated April 9, 1867,
4,106.—STONE PAVEMENT.—Charles Guidet, New York, N. Y.—Patent No. 85,814, dated January 12, 1869.
4,107.—APPARATUS FOR CRUTCHING SOAP.—George M. Leslie, Northumberland, Pa, assignor to himself and Jesse Oakley, New York, N. Y.—Patent No. 44, 142, dated September 6, 1864.
4,108.—BRICK-MACHINE.—The United States Brick-machine Company, Chicago, Ill., assignees of Benjamin M. Gard and Emery R. Gard.—Patent No. 100,136, dated February 22, 1870.

DESIGNS.

4,298.—LAMP-STAND.—James S. Atterbury and Thomas B. Atterbury, Pittsburg, Pa.
4,299.—CLOCK FRONT.—John H. Bellamy, Charlestown, Mass.
4,300.—"PERSIAN CLOAK."—Thomas Dolan, Philadelphia, Pa.
4,301.—"PERSIAN CLOAK."—Thomas Dolan, Philadelphia, Pa.
4,302.—JOINING WOOD.—Charles B. Knapp, Waterloo, Wis.
4,303.—HAIR PIN.—George W. Manson, New York, N. Y., assignor to Charles M. Vandevoort and William F. Fluhyer, same place.
4,304.—ASH PAIL.—John Merry, New York, N. Y.

EXTENSIONS.

ALFRED BAILEY, of Amesbury, Mass.—Letters Patent No. 15,406, dated July 29, 1856.—Improvement in Pegging-Jacks.

SIDNEY W. PARK, of Albany, N. Y., and EDGAR S. ELLS, of Fremont, N. Y.—Letters Patent No. 15,492, dated August 5, 1856.—Improvement in Rotary Knitting-Machines.

EXTENDED BY AN ACT OF CONGRESS.

JOHN BACHELDER, of Boston, Mass.—Letters Patent No. 6,439, dated May 8, 1849; reissue No. 617, dated November 2, 1868.—Improvement in Sewing Machines."

Clarence King.

THIS distinguished geologist and topographer, well known throughout Nevada, passed here yesterday morning on his way to California, to run the boundary line between that State and Oregon. In 1868 Professor KING had under his direction one of the most important explorations ever undertaken in the Great Basin—that of a geological survey of the 40th parallel of latitude, principally in Nevada and the western portion of Utah. The results of this exploration are especially important from the facts obtained relative to the physical geography and meteorology of the country. A base line in a north and south direction was measured by astronomical observations at the two extremities, and from this a network of triangles was extended over the region surveyed, by which the topography was determined and the materials furnished of an accurate map of a part of the country previously imperfectly known. The party under Professor KING's direction in this work consisted of four geologists (including Mr. KING), four topographers, two botanists, one zoologist, and one meteorologist. Sixty boxes of specimens (exclusive of those of botany) were collected and sent to the Smithsonian Institution at Washington, and there arranged for study and classification. The botanical collections were assigned to Professor EATON, of Yale College, for the determination of the species and their relations to the flora of other portions of the United States, the specimens to be then turned over to the Smithsonian Institution. During the past year Mr. KING has been engaged at Washington in preparing an elaborate report of the work performed, accurate maps, etc., and compiling the reports of his subordinates. The work is now in press, is comprised in six large volumes, and will doubtless prove the most valuable contribution to American knowledge made for years. It will prove especially interesting to all engaged in mining, and to those seeking information of the "unexplored region."—*Elko Independent.*

"Defect in Steam-Engines."

ZEALOUS professors of science occasionally call attention to the fact that steam, as a motor, costs much more than it should, and that little over the actual heating value of the fuel is realized in practice. Experiments and experience prove the statements to be virtually correct, and it is a reproach to the mechanical skill of the period that it should be. The loss is not in the theory of the engine, for that is perfect, but in the practice of that theory; or, in plain terms, in the construction of steam-engines. It is an undeniable fact, however, that but few of the steam-engines now constructed work with the economy that they should, or even approximate in performance to the theoretical value of the fuel. Portable engines are turned out by scores, which, although well enough externally, are far from being in a healthy condition in those parts which affect economy. The slide valves are only such in name; they exercise few of the proper functions of this most important detail, and the boilers are heavy, enormously large in fire and heating surface, and every way disproportioned to the size of the cylinders. The feed pumps are poorly got up; the valves lift too much; the water passages are cramped and crooked, and the absence of any proper method for heating the feed water without creating more loss from back pressure on the piston than is gained by injecting hot water into the boiler is often noticeable. We make these statements for the interest of any it may concern, not to find fault. Many stationary engines are in precisely the same condition. It is not the only thing in a slide-valve that it shall open and close the ports at a certain time, but that it shall be properly set for the work it has to do, that it shall exhaust the contents of the cylinder at the proper time, that it shall close properly, and that the load shall be proportioned to the duty. That this is important every one is aware who has ever inspected, or is familiar with, indicator diagrams. We know that engines are often regarded as in chronic or incurable difficulties, because some mysterious cause conflicts with setting the valves properly, but we have frequently found that individuals were more fond of declaring that the defect was very mysterious, than that they were zealous to remedy it. It is very plain, from the simple facts here cited, many of which are so well known among professional engineers as to be truisms, that one of the greatest obstacles in the way of economy in the steam-engine is a want of mechanical accuracy in construction, erection, and oversight; and that the cost of a horse-power could be very much reduced by attention to obvious and well-known defects existing in steam-engines.—*American Engineer.*

Electro-Typographic Machine.

A NEW electro-typographic machine, the invention of M. HENRI FONTAINE, a French barrister, is now at work in one of the public offices in Paris. The object of this machine is to print off with economy and rapidity the quantity of short papers required in law courts, public and private offices, or commercial houses, now executed by the longer and more expensive processes of printing or autography. The machine of M. FONTAINE, like the electric telegraph, is on the principle of substituting fixed for movable types, one type only being employed for the same letter; thus dispensing with the ponderous bulky movable types of the printer. Steel types, representing the different characters used in printing (capitals, small letters, italics, etc.), are ranged around two horizontal discs, placed one over the other. Above these is another metallic circle divided into notches corresponding with the type below. By a very simple machinery, as the handle or bar in the centre presses against the notch representing the letter required, an electric shock lowers the type upon a sheet of paper rolled around a cylinder placed beneath, prints the letter, and again returns to its place. The operation is so rapidly performed that a hundred letters may be easily printed in a minute. When completed, the paper is transferred to a lithographic stone to be worked off. The great recommendation of M. FONTAINE's machine is its great simplicity, the ease and rapidity with which it is worked, its convenient size (about three feet by two) and its moderate cost. The typography is remarkably clear and distinct, from the employment of finely engraved steel types.—*U. S. R. R. & Mining Register.*

Western Slate Quarries.

A FEW weeks ago the cabinet of the General Land Office at Washington, was enriched by a sample from the new quarries in the West, and we have to-day had shown us a piece of slate recently forwarded to this city. The deposit in question is near the most westerly point of Lake Superior, at the junction of the Northern Pacific Railroad and the Lake Superior and Mississippi Railroad, at a point remarkable for being the very head or intersection of the two greatest valleys on the continent, the valley of the Mississippi and that of the St. Lawrence. Twenty-three miles of down grade toward the east will throw the slate upon the steamers of the great lakes. One hundred and thirty-one miles of down grade toward the south will bring it to the barges of the Mississippi. Thus, as it were, by gravity, can this invaluable roofing material be carried from its natural bed to all the great marts from Buffalo to New Orleans. The people of St. Louis are already looking with great interest on this source of supply, and St. Louis capitalists have been prospecting for quarries. That this singular and rare mineral should have been stored at a point so remarkably fitted to be a distributing centre, seems little less than providential; no other locality on the continent can send freight to so many people for so few dollars. The recent advices from the Minnesota quarries now being opened, show that the shipments will begin with the completion through of the Lake Superior and Mississippi Railroad in August.—*Correspondence of the Philadelphia Press.*

Zinc Works.

THE reader's attention is directed to the card of Mr. THUM, in our advertising columns, in relation to the erection and inspection of zinc smelting and manufacturing works.

BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

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April 19 tf.

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CHARLES ROGERS, Solicitor and Manager.

In connection with the publication of the ENGINEERING and MINING JOURNAL and the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtainng of patents.

Being possessed of superior facilities, in connection with our associate attorneys in Washington and foreign countries, for the successful prosecution of this business, we do not hesitate to guarantee satisfaction to all who may entrust their business to our care.

We have engaged as solicitor and manager Mr. CHARLES ROGERS, a well-known expert in this department. Being a practical mechanic, and having been an examiner in the Patent Office at Washington for a number of years, besides enjoying an experience of more than twenty years as a solicitor of patents, Mr. ROGERS is intimately acquainted with all the details of the business, both in and out of the office.

The specifications, drawings, etc., prepared in our office, will be found to compare favorably with those prepared by any other establishment, while the intimate acquaintance of our manager with the routine of business in the Patent Office, gives us a decided advantage in managing difficult cases.

We are fully prepared to prosecute Rejected Cases and Cases in Interference and Infringements, and also to procure Reissues and Extensions of Patents.

We can also furnish Models for use in the Patent Office, to parties who may desire it, as we have made arrangements for this purpose with one of the most skilful machinists in this country, who possesses every facility for getting up models in the most perfect manner, at short notice, and on reasonable terms.

We shall give special attention to the prosecution of Rejected Applications, which have been improperly prepared by the inventor or incompetent attorneys.

We shall be ready at all times to furnish all necessary information and advice to intending applicants, and give our opinion as to the patentability of their inventions, free of charge; and we make it a rule never to take charge of a case unless we see a reasonable probability of obtaining a patent without first giving the inventor our candid opinion as to the probable result of the application.

OUR CHARGES.

Our charges are as moderate as those of any other responsible patent attorneys, as will be seen from the following figures: For preparing a case (whether simple or complicated) and attending to its passage through the Patent Office, our fee is from $30 to $40, which includes all the necessary papers and drawings. If the application is rejected we make no further charge, but prepare all necessary amendments, and, if requisite, appeal to the Board of Examiners-in-Chief. Most Patent Attorneys make an additional charge on each adverse action of the Patent Office, but we have found it more satisfactory to all parties interested to make our full charge at first; and as we expect no contingent fees, it is to our interest to prepare our cases properly at the commencement, thus avoiding annoyance to ourselves and delay in getting out the patent.

The cost of getting out a patent through our agency is—

For first Government fee, stamp, etc	$16
" our fee	$30 to 40
" final Government fee	20
Total	$66 to $76

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Inventors who reside out of New York, and wish to procure a patent, need not go to the expense of visiting this city or Washington, but may send us a model of their invention, or a sketch and brief description; this will enable us to decide as to its probable novelty and patentability, and we can proceed at once to prosecute the case. We shall, however, be glad at all times to see our friends from any section, and give them such information as we are possessed of relating to patents, free of charge. A Post-office order for $16, to pay the first Government fee and stamp duty, should be sent along with the model; our fee $30 to $40, being payable as soon as the application is ready to be sent to Washington.

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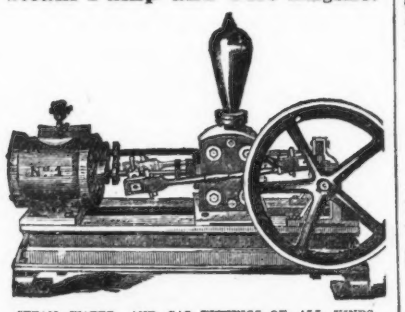

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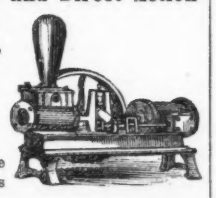

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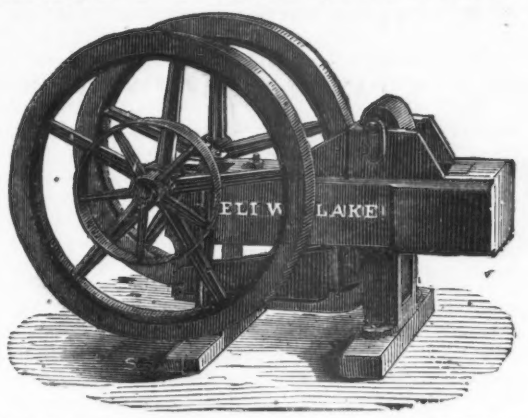

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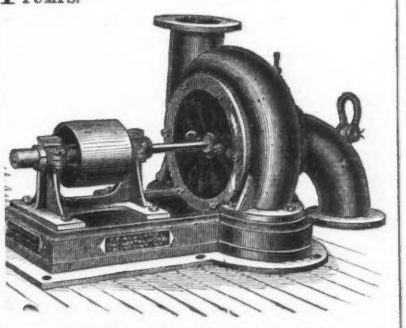

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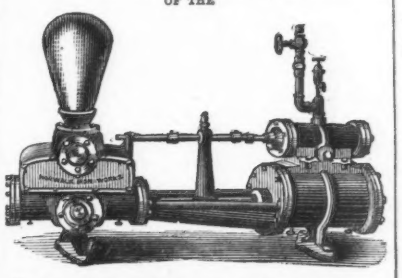

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" Splitting of (plans)
" One current of (plans)
" One current of, and how to adopt separate currents (plan)
" Dividing of, but not into "separate and and distinct" current (plans)
" Crossings (see H on plans)
" Weight of in shafts
" How to find the weight of
" Table of pressure in shafts
" Expansion of
" Its velocity and force
" Rush of, into each division
" Quantity produced by natura ventilation
" Splitting, why it should be adopted
" Splitting, why the workmen object to Mr. Hopton adopting the mode
Anemometer, measurement of air by, engraving of
Area of a pit, how to find
Barometers, Showing the time of an outlet of gas in mines (engraving)
Bricks, how to find the number in the walling of a shaft.
Buddle's plan
Circumference of a pit, how to find
Coal, several ways of working it out, and why man methods of working it out are adopted
" Working out in banks (plans)
" Working it out in following up banks (plan)
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" Working out in long wall (plans)
" Working out in drifts (plans)
" Working out with no regularity (plan)
" Working out by the "end way" or in endings (plan)
Cubical Contents of a pit, how to find
Dialing, the mode of
Dials, several engravings
" How constructed
" How fixed in mine surveying
" Needle, its variations
Diameter of shaft
Dip of mine, how to find and lay on (plan)
Explosion, the power of an
" At Lund-hill, in what part of the mine it was supposed to take place (plan)
" How the power may be diminished
Furnace, how to find the horse-power of
" The place of fixing, to produce the largest ventilating current
" Engravings of ground floor, front and back view
" Remarks upon
Gases, (carbonic acid) composition of
" Do. properties of
" (After, or choke damp) composition of
" (Carburetted hydrogen) do.
" Choke damp and carbonic acid, not one and the same in quality
" The effect produced on people by inhaling such
" The quantity required for an explosive mixture
" The elasticity of
" The weight of
" The nature and quality of
" Why some mines generate and produce more than others
" Why some mines generate a mixture of
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Lund-hill (plan)
Managers, who are best competent to manage mines
Miscellaneous questions
Natural ventilation
Planning, how workings are laid on the plan
Regulations (see R on plans)
Safety Lamps, why flame will not penetrate through, engraving of
Sections on mechanical ventilation
Summary of accidents
Surveying, how mines are with the dial
Surveying, how mines are with the theodolite
Tables of weights and measures
Temperature on surface
Temperature in mines
Temperature, difference of between down and up-cast
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Theodolites, how constructed
Theodolites, the magnetic needle dispensed with, and how workings are laid on plan, with Theodolite surveying
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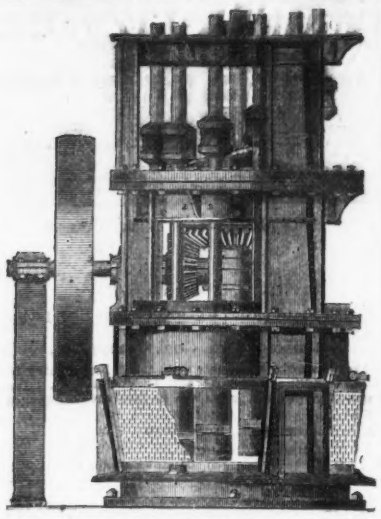

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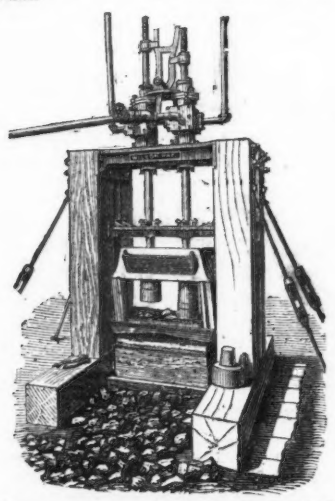

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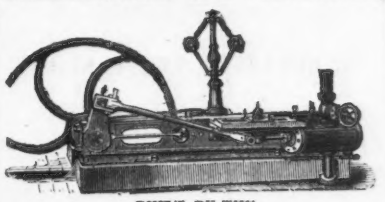

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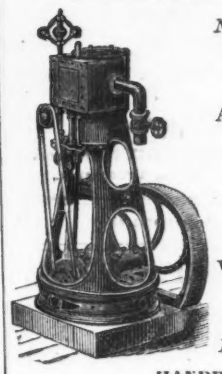

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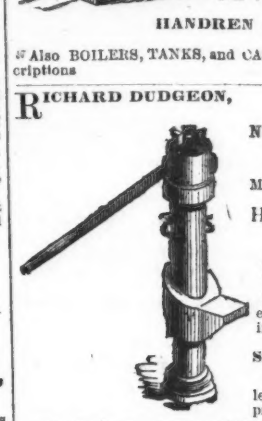

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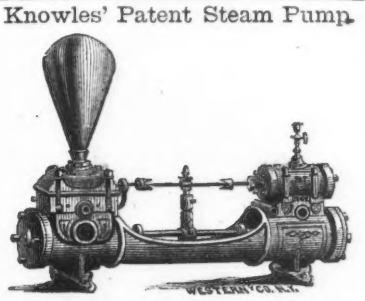

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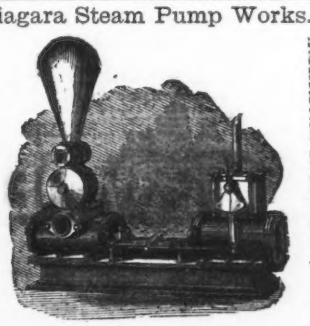

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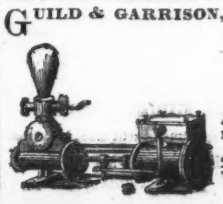

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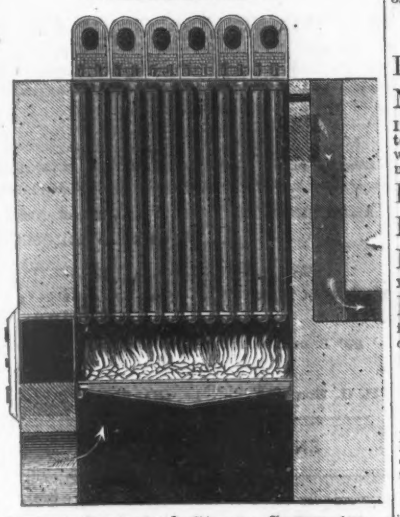

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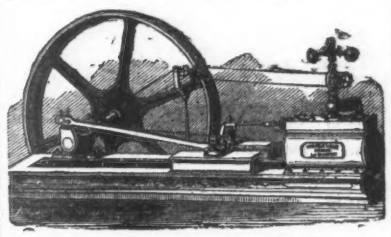

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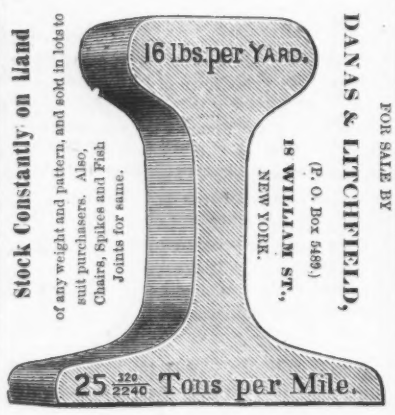

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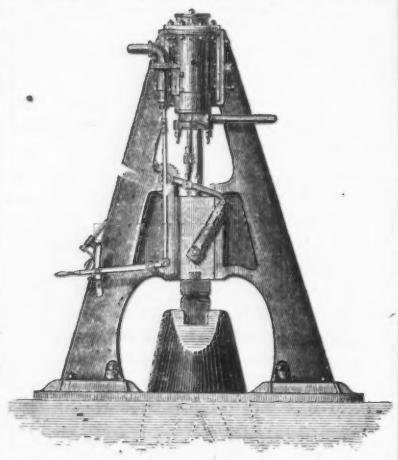

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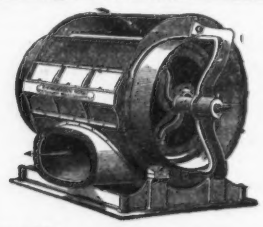

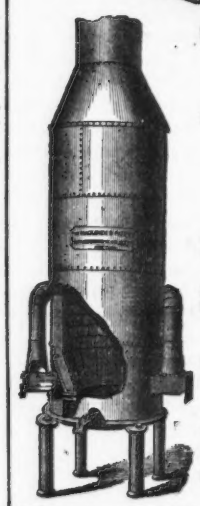

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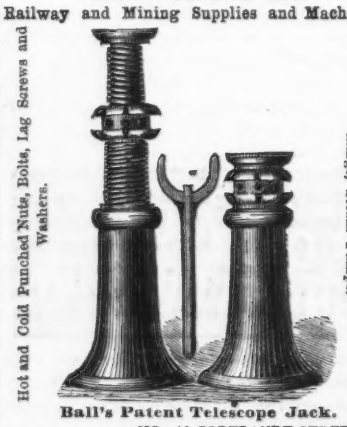

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